153-286

# TRANSCRIPT OF RECORD.

## SUPREME COURT OF THE UNITED STATES.

**OCTOBER TERM, 1893.**

No. ~~322~~. 54

WILLIAM DEERING, APPELLANT,

*vs.*

THE WINONA HARVESTER WORKS, C. L. BONNER, J. J. RANDALL, CASPAR F. SEARCH, AND C. H. PORTER.

APPEAL FROM THE CIRCUIT COURT OF THE UNITED STATES FOR THE DISTRICT OF MINNESOTA.

**FILED OCTOBER 21, 1890.**

**(14,369.)**

# (14,369.)

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1 UNITED STATES OF AMERICA:

WILLIAM DEERING
*vs.*
THE WINONA HARVESTER WORKS, C. L. BONNER, J. J. RANDALL, CASPAR F. SEARCH, and C. H. PORTER.

Pleas before the honorable the judges of the circuit court of the United States of America for the district of Minnesota of the June term of this court, held in the city of St. Paul, in said district, in the year of 1890.

DISTRICT OF MINNESOTA, *ss:*

Be it remembered that on this 10th day of June, A. D. 1885, came the complainant, by his solicitors, and filed in the clerk's office of said court his bill of complaint in the words and figures following, to wit:

2 To the honorable the judges of the circuit court of the United States for the district of Minnesota:

William Deering, of the city of Chicago, in the State of Illinois, and a citizen of the State of Illinois, complainant, brings this his bill against The Winona Harvester Works, of the city of Winona & State of Minnesota, a corporation organized and existing under and by virtue of the laws of the State of Minnesota, and C. L. Bonner, J. J. Randall, Casper F. Search, and C. H. Porter, of the city of Winona, in the State of Minnesota, and citizens of the State of Minnesota, defendants; and thereupon your orator complains and says:

1. That prior to the 29th day of May, A. D. 1877, one John F. Steward was the original and first inventor of a new and useful improvement in grain-binders not known or used by others before his invention thereof and which had not at the time of his application for a patent therefor been in public use or on sale in this country for more than two years, as your orator verily believes; that afterwards and before the issuing of any patent therefor the said John F. Steward, by an instrument in writing duly executed and recorded, sold, assigned, and transferred to your orator and one Elijah H. Gammon all his right, title, and interest in and to said in-

3 vention and in and to any patent or patents that should be afterwards issued therefor, and requested the Commissioner of Patents to issue such patents or patents to your orator and the said Elijah H. Gammon as such assignees, and that upon due application letters patent of the United States No. 191,264, in due form of law, were issued to the said Elijah H. Gammon and your orator as such assignees of the said John F. Steward, dated the said 29th day of May, 1877, granting to them, their heirs or assigns, for the term of seventeen years, the full and exclusive right and privilege of making, using, and vending to others to be used the said invention, as by reference to said letters patent or a certified copy thereof

here in court to be produced and a copy of the specifications and drawings of which is hereto attached will more fully appear.

2. That prior to the 27th day of January, A. D. 1880, one William F. Olin was the original and first inventor of a new and useful improvement in harvesters not known or used by others before his invention thereof and which had not at the time of his application for a patent therefor been in public use or on sale in this country for more than two years, as your orator verily believes, and that upon due application letters patent of the United States No. 223,812, in due form of law, were issued to the said William F. Olin, date- the said 27th day of January, 1880, granting to him, his heirs or assigns, for the term of seventeen years, the full and exclusive right and privilege of making, using, and vending to others to be used the said invention, as by reference to said letters patent or a certified copy thereof here in court to be produced and a copy of the specifications and drawings of which is hereto attached will more fully appear.

4 3. That prior to the 20th day of December, A. D. 1881, one John W. Webster was the first and original inventor of a new and useful improvement in harvesters not known or used by others before his invention thereof and which had not at the time of his application for a patent therefor been in public use or on sale in this country for more than two years, as your orator verily believes; that afterwards and before the issuing of any patent therefor the said John W. Webster by an instrument in writing, duly executed and recorded, sold, assigned, and transferred to your orator all his right, title, and interest in and to said invention and in and to any patent or patents that should be afterwards issued therefor, and requested the Commissioner of Patents to issue such patent or patents to your orator as his assignee, and that upon due application letters patent of the United States No. 251,147, in due form of law, were issued to your orator as such assignee of the said John W. Webster, dated the said 20th day of December, 1881, granting to him, his heirs or assigns, for the term of seventeen years, the full and exclusive right and privilege of making, using, and vending to others to be used the said invention, as by reference to said letters patent or a certified copy thereof here in court to be produced and a copy of the specification and drawings of which is hereto attached will more fully appear.

4. That prior to the 31st day of October, A. D. 1882, one John F. Steward was the original and first inventor of a new and useful improvement in grain-binders not known or used by others before his invention thereof and which had not at the time of his ap-

5 plication for a patent therefor been in public use or on sale in this country for more than two years, as your orator verily believes; that afterwards and before the issuing of any patent therefor the said John F. Steward, by an instrument in writing duly executed and recorded, sold, assigned, and transferred to your orator and one Elijah H. Gammon all his right, title, and interest in and to said invention and in and to any patent or patents that should be afterwards issued therefor, and requested the Commissioner of Patents to issue such patent or patents to your orator and

the said Elijah H. Gammon as such assignees, and that upon due application letters patent of the United States No. 266,913, in due form of law, were issued to the said Elijah H. Gammon and your orator, as such assignees of the said John F. Steward, dated the said 31st day of October, 1882, granting to them, their heirs or assigns, for the term of seventeen years, the full and exclusive right and privilege of making, using, and vending to be used the said invention, as by reference to said letters patent or a certified copy thereof here in court to be produced and a copy of the specification and drawings of which is hereto attached will more fully appear.

5. That prior to the 20th day of February, A. D. 1883, one John F. Steward was the original and first inventor of a new and useful improvement in grain-binders not known or used by others before his invention thereof and which had not, at the time of his application for a patent therefor, been in public use or on sale in this country for more than two years, as your orator verily believes, and

6 that upon due application letters patent of the United States No. 272,598, in due form of law, were issued to the said John F. Steward, dated the said 20th day of February, A. D. 1883, granting to him, his heirs or assigns, for the term of seventeen years, the full and exclusive right and privilege of making, using, and vending to others to be used the said invention, as by reference to said letters patent or a certified copy thereof here in court to be produced and a copy of the specification and drawings of which are hereto attached will more fully appear.

6. That afterwards, to wit, on the — day of ——, A. D. 18—, the said Elijah H. Gammon, by an instrument in writing, duly executed and recorded, sold, assigned, and transferred to your orator all his right, title, and interest in and to said letters patent Nos. 191,264 and 266,913 — in and to all and singular the exclusive rights and privileges secured thereby; that afterwards, to wit, on the — day of ——, A. D. —, the said William F. Olin, by an instrument in writing, duly executed and recorded, sold, assigned, and transferred to your orator all his right, title, and insterest in and to said letters patent No. 223,812 and in and to all and singular the exclusive rights and privileges secured thereby; that afterwards, to wit, on the 8th day of June, A. D. 1885, the said John F. Steward, by and instrument in writing, duly executed, sold, assigned, and transferred to your orator all his right, title, and interest in and to said letters patent No. 272,598 and in and to all and singular the exclusive rights and privileges secured thereby, and that by virtue

7 of the premises and said assignments your orator became and ever since has been and now is the sole and exclusive owner of said letters patent Nos. 191,264, 223,812, 251,147, 266,913, and 272,598, and of all and singular the exclusive rights and privileges secured thereby, and is now entitled to sue for and receive to his own use all damages and profits arising out of or occasioned by infringements thereof.

7. That your orator verily believes the said John F. Steward to have been the original and first inventor and discoverer of the inventions and improvements described and claimed in said letters patent Nos.

191,264, 266,913, and 272,598; the said William F. Olin to have been the original and first inventor and discoverer of the inventions and improvements described and claimed in said letters patent No. 223,812, and the said John W. Webster to have been the original and first inventor and discoverer of the inventions and improvements described and claimed in said letters patent No. 251,147, and that all said letters patent are in all respects good and valid in law; that your orator is extensively engaged in manufacturing harvesting machinery and for several years last past has been extensively engaged and at great expense in manufacturing and putting upon grain-binders the inventions and improvements described and claimed in said letters patent respectively, and generally that the exclusive rights and privileges secured by said letters patent are of great value.

8. That since the granting of said letters patent respectively and at divers times and occasions prior to the filing of this your orator's bill The Winona Harvester Works, C. L. Bonner, J. J. Randall, Casper F. Search, and C. H. Porter, the defendants herein,
8 well knowing the premises and in infringement of said letters patent and in violation of the exclusive rights of your orator thereunder and without the license of your orator or any one ever interested in said letters patent or any of them, at Winona, to wit, at the district aforesaid, have made and sold to others for use, and still continue to make and sell to others for use, harvesting machines embodying and having on them as a part thereof the inventions and improvements described and claimed in said letters patent respectively; that said invention and improvements described and claimed in said letters patent respectively relate to and are capable of being used in and upon one and the same machine, and that they have been and are being so used by the said defendants; that said defendants have been notified of their said infringement and requested to desist therefrom, but that they refuse so to do and persist in making and selling said grain-binders embodying and having on them as a part thereof the said inventions and improvements described and claimed in said letters patent respectively; that great and irreparable damages and injury has resulted to your orator from said infringement and great gains and profits have accrued to said defendants therefrom, the full amount of which is unknown to your orator, but which in equity belongs to him and should be accounted for by said defendants and paid over to your orator as the avails of his exclusive rights aforesaid and profits and gains which he would have derived therefrom but for the unlawful acts of said defendants, and that your orator has reason to believe and fear and does believe and fear that he will continue to suffer great loss and damage unless the said defendants be restrained from the further infringement of said letters patent.

9 9. That your orator has no adequate remedy in the premises save in a court of equity, where matters of this nature are properly cognizable.

10. To the end, therefore, that the said defendants, The Winona Harvester Works, C. L. Bonner, J. J. Randall, Casper F. Search, and

C. H. Porter, may answer the premises (but not under oath, an answer under oath being hereby expressly waived); that said defendants may be enjoined and restrained, as well preliminarily and provisionally as perpetually, from further infringing said letters patent and violating your orator's exclusive rights thereunder; that said defendants may be decreed to account with and pay over to your orator all the gains, profits, savings, and advantages to be duly determined, made, derived, or received by them from the unlawful use of said patented inventions as aforesaid and all damages resulting to your orator therefrom, together with such increase over the actual damages suffered as is warranted by law and may seem just and proper, and that your orator may have such other and further relief in the premises as may be agreeable to equity and good conscience and as to your honors shall seem meet—

May it please your honors to grant unto your orator the writ of subpœna issued out of and under the seal of this honorable court, directed to the said defendants, The Winona Harvester Works, C. L. Bonner, J. J. Randall, Casper F. Search, and C. H. Porter, commanding them by a certain day and under a certain penalty to be and appear in this honorable court, then and there to answer the premises and to stand to and abide by such order and decree as may be made against them, and also the writ of injunction, as well *preliminary* and provisional as perpetual, issuing out of and under the seal of this honorable court, enjoining and restraining the said defendants, The Winona Harvester Works, C. L. Bonner, J. J. Randall, Casper F. Search, and C. H. Porter, their agents, attorneys, servants, and workmen and each and every of them, as is heretofore in that behalf prayed.

And your orator will ever pray, etc.

WILLIAM DEERING,
By J. F. STEWARD.

BANNING & BANNING,
*Solicitors for Complainant and of Counsel.*

STATE OF ILLINOIS, }
*Cook County,* } *ss:*

John F. Steward, agent for William Deering, the above-named complainant, being duly sworn, upon oath says that he has read the foregoing bill subscribed by him and knows the contents thereof, and that the same is true of his own knowledge except as to matters therein states on information and belief, and as to these matters he believes the said John F. Steward to have been the original and first inventor and discoverer of the inventions and improvements described and claimed in said letters patent Nos. 191,264, 266,913, and 272,598; the said William F. Olin to have been the original and first inventor and discoverer of the inventions and improvements described and claimed in said letters patent Nos. 223,812, and the said John W. Webster to have been the original and first inventor and discoverer of the inventions and improvements described and claimed in said letters patent No. 251,147, and that all said letters

patent are in all respects good and valid in law and the title thereto vested in the complainant as alleged in said bill.

J. F. STEWARD.

Subscribed and sworn to before me this 8th day of June, A. D. 1885.

E. F. HUBBARD,
*Notary Public.*

[NOTARIAL SEAL.]

(Endorsed:) Filed June 10th, 1885. Oscar B. Hillis, clerk.

No. 322
Deering
v.
Winona
Hawkstee
Works et al.
p. 11

(No Model.) 2 Sheets—Sheet 1.

J. F. STEWARD.

GRAIN BINDER.

No. 272,598. Patented Feb. 20, 1883

Fig. 7.



Fig. 1.

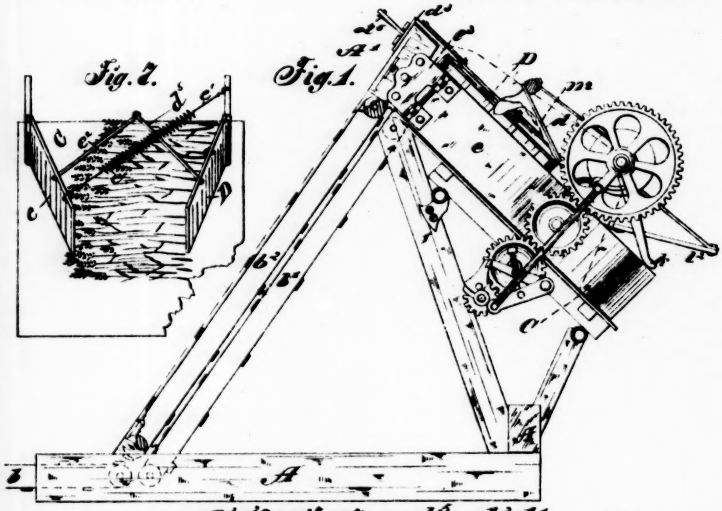
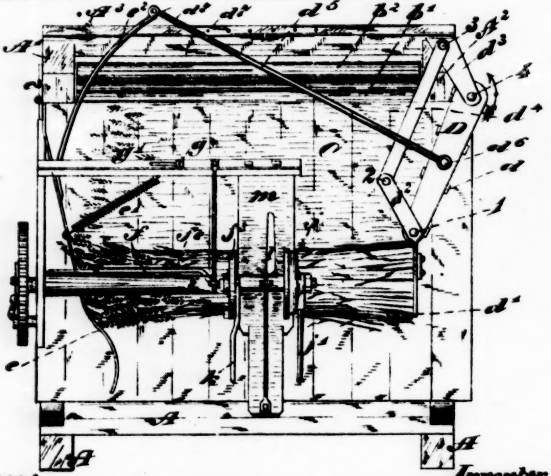


Fig. 3.



Witnesses:
James Gilchrist
John B. Kaspari

Inventor:
John F. Steward

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v.
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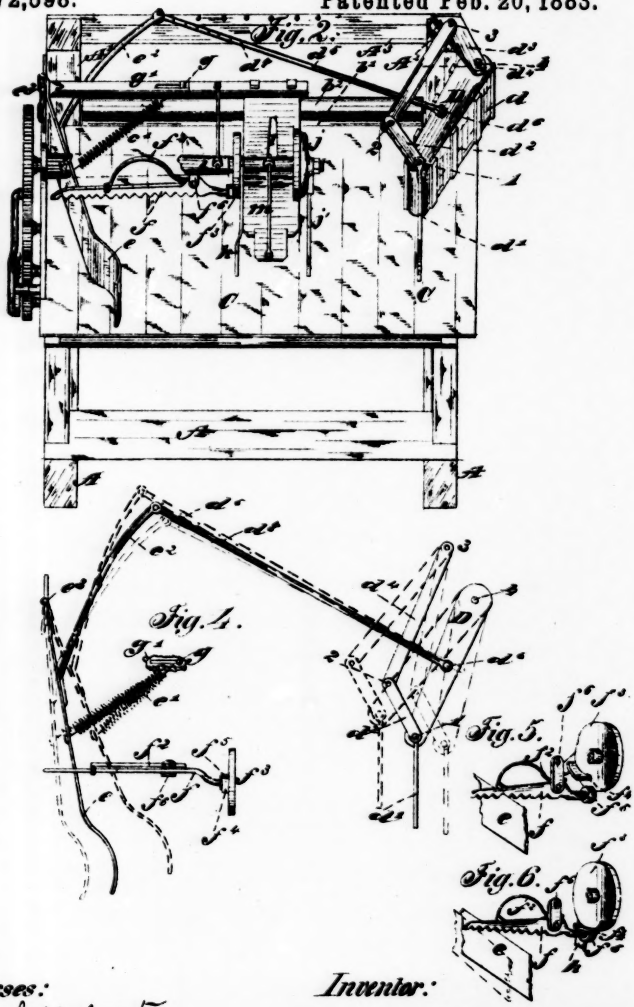
Harvester
Walker et al.
M. 12

(No Model.) 2 Sheets—Sheet 2.

J. F. STEWARD.

GRAIN BINDER.

No. 272,598. Patented Feb. 20, 1883.




Witnesses:
James Gilchrest
John B. Kaspar

Inventor:
Jesse F. Steward

13 UNITED STATES PATENT OFFICE.

JOHN F. STEWARD, of Chicago, Illinois.

*Grain-binder.*

Specification forming part of Letters Patent No. 272,598, dated February 20, 1883. Application filed October 9, 1882. (No model.)

To all whom it may concern:

Be it known that I, JOHN F. STEWARD, of the city of Chicago, county of Cook, and State of Illinois, have invented certain new and useful improvements in grain-binders, of which the following is a full specification, reference being had to the accompanying drawings, in which—

(Here follow diagrams marked pp. 11 & 12.)

Figure 1 is a rear end view of the frame-work of the harvester, showing the binder in its proper relation thereto. Fig. 2 is an outer or stubble side view of the same. Fig. 3 shows the parts as viewed from a point above and in a line at right angles to the decking of the binder. Fig. 4 shows the various positions assumed by the parts that constitute my invention. Figs. 5 and 6 are details. Fig. 7 shows a modification.

The object of my invention is to provide means that, combined with an automatic grain-binder, shall make it automatically regulate the position of the band on the gavel—that is, shall automatically place the band upon the gavel in its proper position relative to the length of the grain without any aid or attention from the operator; and its nature consists in locating, in such a position as to be influenced by the heads of the incoming grain, or gavel or bundle, a device to be moved thereby, the said device connected with means for adjusting the relative positions of the said grain and the binding mechanism. Under the principle involved many methods may be resorted to to attain the result. I have selected and developed what appears to me to be the most feasible plan. Several subordinate ends are reached by the different elements of the device, which will be pointed out.

My invention is capable of being applied to any form of binder, but I here show it applied to one now much used. I will describe the binder only so far as is necessary to a correct understanding of my improvement.

In the drawings, A is the frame-work of the harvester, upon which the binder is mounted; *b*, the platform-canvas; *b'* and *b²*, the elevating-canvases.

C is the chute-board or decking, onto which the grain is deposited in a loose state by the elevators, and it is slotted to permit the packers and needle to work through it.

D is the grain-adjusting mechanism, consisting of a frame carry-

ing a roller at each end, around which rollers is drawn the endless canvas *d*. The larger or upper roller is driven from the gearing of the harvester in the usual manner, and moves in the direction indicated by the arrow in Fig. 3. The adjuster-frame vibrates on the axis of this upper and driving roller. So far the adjusting and butting mechanism does not differ from many in use, and constitutes no part of the present invention, only as combined with other elements.

$d^3$ is an arm secured to the top of the post $A^2$, overreaching the decking parallel therewith, and to this arm above and to the deck below is pivoted the swinging frame D.

$d'$ is a thin board or plate of metal, as wide as the adjusting-canvas, and pivoted to the frame of the latter at its lower extremity. From this board reaches upward and inward (see Fig. 3) an arm, $d^2$. The board and arm are as one piece; but the board itself is made in two parts, so that its greater portion (which is the lower) can be removed.

Near the end of the arm $d^2$ is pivoted the bar $d^4$, connecting the arm $d^2$ with the overreaching arm $d^3$ near its top. In this arrangement we have four pivots, numbered 1, 2, 3, and 4. The distance between 1 and 2 is equal, or nearly so, to that between 3 and 4, and the distance between 1 and 4 to that between 2 and 3. In effect, then, the parts D, $d^2$, $d^3$, and $d^4$ describe a quadrilateral having substantially equal and parallel sides, so that to whatever point the frame D is swung in its adjustment the arm $d^2$ will remain parallel with the fixed arm $d^3$, and the board $d'$ will always remain parallel with the edge of the decking, close to and over which the whole vibrate.

$d^5$ is a connecting-rod pivoted at $d^6$ to the frame D, the adjustment of which it controls, and reaches upward and backward over the decking, passing near the top rail $A^3$ of the harvester-frame. It is provided with the holes $d^7$ at a point where it passes the top rail, in which latter holes are also provided, so that by means of a pin passing through one and entering the other the whole device can be secured in any position; but it must be remembered that this means for securing the parts in place is but for use in special cases, which will be hereinafter pointed out.

13½ The board $d'$ is of such length as to reach as low as the accumulating gavel and prevent the grain forming it while accumulating from working or jarring forward. The butting or adjusting mechanism is given an amount of variation in its adjustment from a line parallel with and over the front edge of the chute-board to a point so far backward as to carry short grain sufficiently far back to be bound centrally. Three positions are shown in Fig. 4.

*e* is a board or plate of metal, nearly equal in width to that of the adjusting-canvas *d*. It is pivoted to the post A′ of the harvester by any suitable means. I show it hinged to a plate, $e^3$, bolted to the said post. It lies in a position to the deck or chute-board corresponding with that of the adjusting-canvas. This board or plate is nearly straight from the pivotal point downward to nearly its lower

extremity, where it curves forward toward the bundling devices and then backward. The form may be much varied, but I consider the curvature here given best. When the gavel is in the position to be bound it is still just above the curve in the plate, as seen in Fig. 3.

$e'$ is a spring secured at one end to the upper edge of the board $e$, at about the middle of its length, the other end of the said spring being attached to a bolt, $g$, adjustable in a slot in the bar $g'$ of the frame-work of the binder. By this means the plate $e$ is caused to press elastically toward the grain, when not restrained by locking mechanism hereinafter explained, and the elastic pressure is adjustable as circumstances may require.

$e^2$ is an arm secured to the board $e$ at its upper edge and near its top or hinged end, the said arm reaching upward over and parallel with the decking and connecting by a joint with the rod $d^5$. By this means the movement of the board or plate $e$ is transmitted to the adjuster D, so that it moves in a reverse direction. In other words, the two parts, operating one on the heads and the other on the butts of the grain, are so connected that they approach or recede from each other when one is moved. These parts, because of their weight, are inclined to swing apart, and also, because of the tendency of the motive power on the canvas $d$, to swing its frame outward, and hence the spring $e'$ must be strong enough to overcome these tendencies, and as much stronger as is wished to have the parts moved quickly by the said spring when it is at liberty to move them.

With the above-described parts in the positions shown in Fig. 3, and the bundle as there shown, it is plain that if the bundle is quickly ejected it must engage the curved part of $e$ and force it out of its way, and hence backward, and the butting-canvas being connected thereto it will be moved forward. Two forces then are apparent—the bundle to force the parts opposing its head and butt from each other, and the spring to retract them. In order that each bundle shall leave the parts fixed for the time being in any position it may have caused them to assume, I provide a locking device that shall at all times retain the parts, except just while the head of each bundle is passing the curve on the plate $e$, which device is constructed as follows:

From the arm $i$ of the binder-frame (cut away in Fig. 2 to show the latching device) I depend a support, $f^6$. To this is pivoted the lever $f$, which lever is notched upon its lower edge. The position of this lever is such that its notched edge rests upon the upper edge of the plate or board $e$. From its pivotal point this lever reaches forward a short distance to the disk $f^3$, and is provided with an anti-friction roller, $f^5$, which is engaged and moved by the cam $f^4$ on the said disk, the latter being keyed to the knotter-driving shaft, which makes one complete revolution to each operation of the binding mechanism. The lever is thus lifted from off the plate $e$ once in each revolution for an instant. The time of this lifting is made to correspond with the action of the discharge-arms $j'$ and $k$, so that when they have engaged the bundle to eject it the plate $e$ shall be

free to respond to any pressure of the bundle while the latter is passing its curved end.

$f^2$ is a spring acting upon the latch-lever $f$ to return it quickly to its place for engagement with the plate $e$ after being acted upon by the cam $f^4$.

$m$ is the breast-plate between the tying mechanism (not shown) secured to it and the grain being bound. $l$ is a slot for the passage of the needle. $j$ is the knotter-rotating gear, to which is secured the discharge-arm $j'$. To the disk $f^3$ is secured the discharge-arm $k$.

Before describing the operation of the parts conjointly, I wish to state that certain parts of my invention are capable of use singly as well as conjointly, and I will first point out such independent action, believing that their joint action will be more quickly understood. First, if the pivot-bolt connecting $e^2$ and $d^5$ and the locking device be removed, and a pin is inserted into the holes in the top rail and through the holes $d^7$ in the connection $d^5$, I have an adjustable butting mechanism supplemented by the board $d'$ for preventing the gavel from working forward by the jarring of the machine, which shucking out of position is often very great in grain that is heavy at the butts; secondly, with the same parts removed, I have an elastically-swinging board for directing scatterings caused by imperfect adjustment of the reel of the harvester or any other cause into the gavel, whether the grain be long or short, and especially when short, as without this board there is a clear space between the heads of the gavel and the rear limit of the chute, where scattering may pass freely to the ground.

With the parts all connected, as best shown in Figs. 2 and 3, I have, as before stated, a device for regulating the position of
14 the grain relative to the binding mechanism, the operation of which I will now describe.

The use of the canvas $d$ and the board $e$ produces a new and beneficial result in their joint action upon the grain. In grain that stands thin on the ground, and hence is of that condition which always passes up the elevators head first, the butts are advanced by the revolving canvas and the heads are retarded by the contact with the board $e$, and thus reach the binding-receptacle in much better condition than when the old devices, or none, are used. The cut grain falls on the platform-canvas and is conveyed to and elevated by the elevating-canvases and delivered in a loose state onto the table, when it is engaged by the usual pushing mechanism and forced forward to the binding mechanism, where it is bound, and from which it is finally ejected by the discharge-arms or other means. With the butting mechanism, and the board or plate $e$ in their positions nearest approaching each other, we will suppose the grain first acted upon to reach them. If the grain is long, the head of the bundle, when discharged, will press forcibly against $e$, more especially against its curve, and force it backward, it being at the proper instant permitted to move by being unlocked by the action of the cam $f^4$. The first bundle thus bound may be carried too far backward in its approach to the binding mechanism, and hence bound too near the butt; but when it is discharged the butt-adjust-

ing device acts under the influence of the plate *e*, and is hence moved forward to a position more nearly in keeping with the requirements, and the next bundle will be bound farther from the butt. If when going into a field of short grain the butt-adjusting mechanism and plate *e* are wide apart, the first bundle will be deposited too far forward in the receptacle, and hence bound too near the heads; but upon its discharge the board *e* will be permitted to jump or swing with a quick movement to a position as far forward as the position of the bundle at that instant will permit, and hence the butting mechanism will be set for short grain. If the device is set to proper position for the first bundle before going into the grain, it will be properly bound, and it will leave the parts in position for the succeeding one.

For the sake of clearness, I will further say the butt-adjusting mechanism in all cases directs the grain to the binding devices, (except litterings that are thrown backward.) The position to which the butt-adjuster is swung determines the relative position of the gavel to the binding mechanism. The passage of a bundle so long or far backward that its head will forcibly move the swinging plate when the latter is unlocked will cause the butt-adjusting mechanism to move forward and deposit the succeeding grain in a position farther forward in relation to the binding devices. If grain of decreasing length passes, the spring *e'* will cause the plate *e* to jump, when unlocked, until it meets the heads of the same, and the butt-adjusting mechanism thus be moved to deposit the grain of each succeeding shorter gavel a little farther back in relation to the binding mechanism.

It may seem to those theoretically versed in the art, yet unfamiliar with the operation of harvesting machinery in actual work, that the adjustments will not be perfect; but when the fact is taken into account that the change of length of grain which the machine advances to meet is generally gradual, and that the gavels increase and decrease in length gradually, the movement imparted to the regulating device will be competent to do its work, which it does in practice to a remarkable degree.

The modifications that may be made in this arrangement are almost unlimited. For instance, the butting device may be of any kind competent to give the swath direction into the receptacle, or it may be of the kind that moves the gavel bodily endwise. The board or plate *e* may be connected with the butting mechanism in various ways, and the plate *e* itself may be varied, yet should any device be used capable of being influenced by the heads of the grain, whether in swath, gavel, or bundle, for the purposes set forth, I should consider it an equivalent. The spring *e'* may be connected with the butting mechanism direct as to any of the moving parts. The locking arrangement may be varied, and even dispensed with under some circumstances. These suggested modifications are shown in an additional figure—that numbered 7. In this the grain is shown as operated at each end by the two plates or boards, and it is plain that as the distance between these boards at their delivery end is regulated by the length of the grain, the butt-board will

be caused to deliver the incoming grain properly. This would be used in that class of binders where the grain accumulates in the receptacle in a free state, and is taken bodily therefrom by the needle. The plate $e$ may be located upon the elevator and connected with the adjusting or butting mechanism and produce the same effect.

In the modification shown in Fig. 7, C is the deck, and D the butt-adjuster. $e$ is the swing-board, located so as to be influenced by the heads of the grain. $e^2$ and $d^5$ are stiff arms, reaching from their respective boards and meeting in a joint, being so connected if one moves the other must do so, but in a reverse direction. Now, if the spring $e'$, or any spring, is attached as shown in Fig. 3, the boards will be drawn together with a slight stress, and any body of grain passing through will spread them apart at their lower extremities. It is plain that whatever the length of grain passes, its center will always be at the same place.

What I claim is—

1. In a grain-binder, the combination of the butt-adjuster with means, substantially such as described, for setting the butt-
144 adjuster for operation on the flowing grain, said means being adapted to be operated by the grain, as and for the purpose described.

2. The combination of the adjusting mechanism of a grain-binder with means, substantially such as described, for automatically setting the adjuster for directing the grain into the binding mechanism, as set forth.

3. The combination of the swinging revolving canvas for advancing the butts of the grain with the board $e$ for retarding the heads of the same.

4. The combination, with the delivery apparatus of a harvester, of a self-setting plate, $e$, on the binder-table, adapted to be operated by the grain for directing scattering grain into the succeeding gavel, substantially as described.

5. The combination, with the harvester delivery apparatus, of the self-setting plate $e$ and the spring $e'$, adjustable in its tension, substantially as described.

6. The combination of the board $e$, spring $e'$, bolt $g$, and slotted bar $g'$, substantially as described.

7. In a grain-binder, mechanism for adjusting the butts of the grain, said mechanism adapted to be adjusted by the action of the grain.

8. The combination, with the harvester delivering apparatus and the elastically-yielding butt-adjusting mechanism, of means, substantially such as described, for varying the stress of elasticity, as set forth.

9. In combination with the bundle-discharging mechanism of a grain-binder, the board $e$, for the purposes set forth.

10. The combination of the discharge-arms, the board $e$, and the butt-adjusting mechanism, substantially as described.

11. The combination of the self-setting board $e$, and locking mechanism, substantially as set forth.

12. The plate or board $e$ and connecting mechanism as means for transmitting the power exerted by the spring $e'$ and swath or bundle of grain to the butt-adjusting mechanism, substantially as described.

13. The combination of the spring-latch with the board $e$, substantially as described.

14. The combination, with the board $e$, of the butt-adjusting mechanism and the board-locking mechanism, substantially as described.

15. The combination of the board $e$ and butt-adjusting mechanism with intermittently-operating mechanism for locking the board $e$, substantially as described.

16. The elastically-yielding butt-adjusting mechanism, in combination with locking mechanism, substantially as described.

17. The combination, with the self-setting butt-adjusting mechanism, of the latch $f$ and cam $f^4$, substantially as described.

18. The combination of the board $e$, arm $e^2$, connecting-rod, $d^5$, butt-adjusting mechanism, and board $d'$, substantially as described.

19. The combination of the board $e$ and board $d'$, substantially as described.

20. The combination, in a grain-binder, of moving butt-adjusting mechanism and the board $d'$, substantially as described.

21. The combination of the swinging butt-adjuster, the arms $d^2$, $d^3$, and $d^4$, and the board $d'$, pivoted to the swinging butt-adjuster, substantially as described.

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Witnesses:
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[On back of diagram marked p. 15.]

U. S. Circuit Court, Dist. of Minnesota.

WM. DEERING & Co. )
*vs.* ) Equity.
McCORMICK H. W. Co. )

DEFENDANT'S EXHIBIT OLIN PATENT. A. S. W., Notary Public. Filed May 13, 1889. Oscar B. Hillis, clerk.

17 UNITED STATES PATENT OFFICE.

WILLIAM F. OLIN, of Chicago, Illinois.

*Harvester.*

Specification forming part of Letters Patent No. 223,812, dated January 27, 1880. Application filed November 17, 1877.

To all whom it may concern:

Be it known that I, William F. Olin, of the city of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful improvements in harvesting-machines; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it pertrains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

(Here follow diagrams marked pp. 15 & 16.)

Figure 1 is a front elevation; Fig. 2, a top or plan view; Fig. 3, a detail of the cover of the elevator; Fig. 4, a detail, in section, of the devices for elevating the butts of the grain; Fig. 5, a detail of the same parts; Fig. 6, a detail, showing the devices for shifting the butt-elevator.

In that class of harvesting machines where the grain is received upon a carrier-platform and elevated over the drive-wheel by an elevator and deliverer to the binders or an automatic binder it is desirable that there shall be no stoppage in the flow of the grain in its passage to its place of delivery; that the butts of the grain shall be carried up parallel, or nearly so, with the heads of the grain, so as to deliver the grain in proper shape for binding purposes, and that the grain shall be delivered to the receiving-table so that it can be bound at or near the middle.

The object of this invention is to provide devices for attaining all of these results; and it consists in interposing a roller between the lower end of the elevator and the inner end of the grain-carrier, to facilitate elevating the grain and prevent clogging at that point, and

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2 Sheets—Sheet 1.

# W. F. OLIN.

## Harvester.

No. 223,812. Patented Jan. 27, 1880.

Fig. 1.

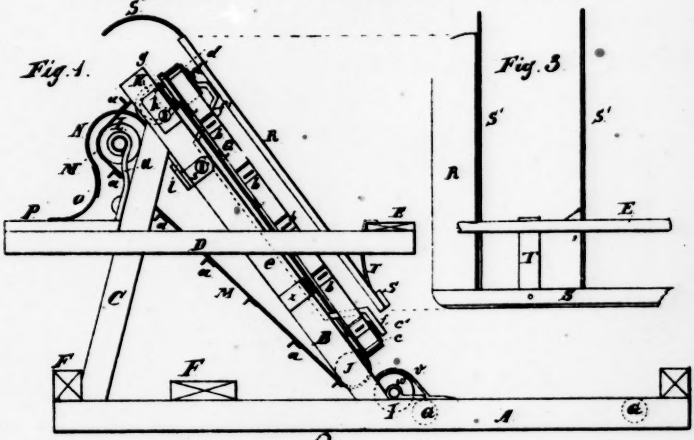
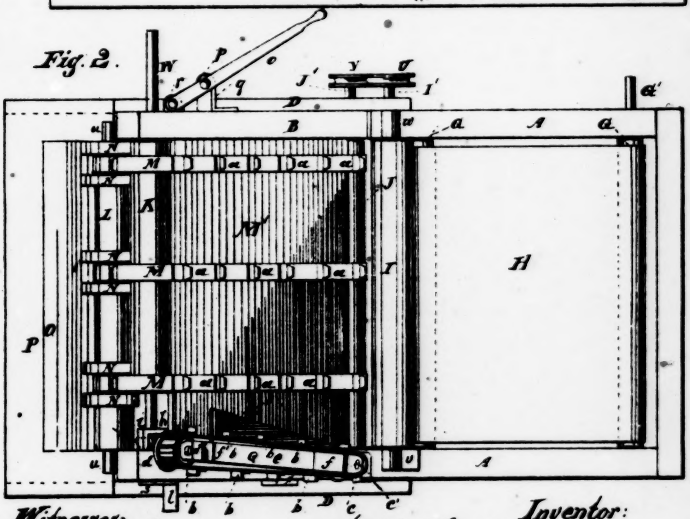


Fig. 3.



Fig. 2.



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2 Sheets—Sheet 2.

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Harvester.

No. 223,812. Patented Jan. 27, 1880.

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Fig. 4.

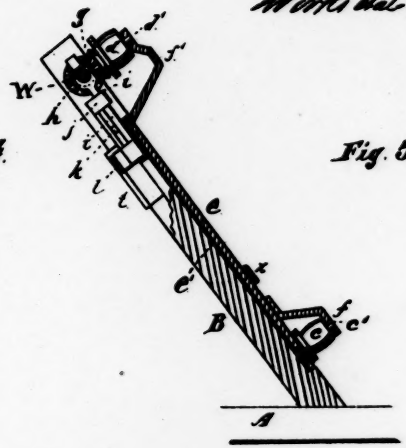
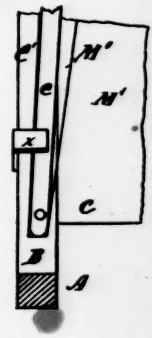



Fig. 5.



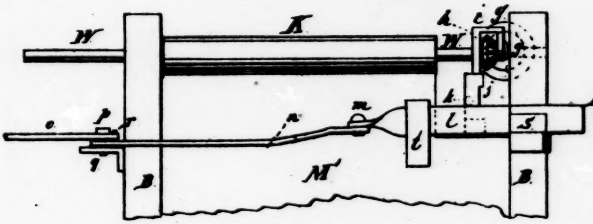




Fig. 6.

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prevent the grain from being carried down or falling through between the elevator and carrier; in providing a belt or chain at the grain side of the machine for elevating the butts of the grain, supported on a swinging bar, so that it can be adjusted, according to the length of grain being elevated, to deliver the grain so that it can be bound at the middle; in devices for operating and adjusting the elevator for the butts; in the peculiar construction of the cover; in arranging and operating the belt for the butts so that it prevents any clogging by short grain at the heel of the sickle; in arranging the device for elevating the butts so that it will bear against the butts of the grain and crowd or move the grain back on the elevator toward the center, for the purpose of straightening the grain in its passage up the elevator, and delivering it so that in can be clasped or bound near the middle, to facilitate the ease of binding; and in the several parts and combination of parts hereinafter described as new.

In the drawings, A represents the main frame; B C, the elevator-frame; D, the cross-pieces supporting the binder-table or platform or binder; E, the cross-piece secured to the cross-pieces D, and supporting the driver's seat; F, the cross-pieces between which the main or driving wheel (not shown) is located, and on which it is journaled in any suitable manner; G, the rollers for the carrier-platform; G′, the axles or shafts of said rollers; H, the carrier-platform; I, the interposed roller; I′, the shaft of the roller I; J, the lower elevator-roller; J′, the shaft of the roller J; K L, the upper elevator-rollers; M, the elevating-belts; M′, the backing-board; M″, the angular opening on the front edge of the backing-board; N, the strips of metal or fingers at the upper end of the elevator; O, the curved piece of metal supporting the fingers N; P, the platform on which the grain is delivered; Q, the belt for elevating the butts; R, the board portion of the cover; S, the cross-piece secured to the board R; S′, the spring-arms, forming the other portion of the cover; T, the springs connecting the piece S with the driver's platform; U V, the driving-pulleys; W, the shaft of the roller K; *a*, the teeth on the elevating-belts; *b*, the teeth on the butt-elevator belt; *c d*, the pulleys carrying the butt-elevator belt; *c′ d′*, the pulley-shafts; *e*, the pivoted connecting bar or strap, on which the butt-elevator pulleys are mounted; *f f′*, the caps for the pulleys *c d*; *g h*, the miter-wheels, giving motion to the butt-elevator; *i*, the sliding head or journal-support for the miter-wheel *g*; *j*, the frame or guide in which the support *i* slides; *k*, the pin for holding the head *i* in place laterally; *l*, the sliding plate or bar; *m*, the pivot for the sliding plate *l* and bar *n*; *n*, the bar connecting the
17½ sliding plate with the operating-lever; *o*, the lever; *p*, the pivot for the lever *o*; *q*, the bracket supporting the lever; *r*, the pivot at lower end of lever for connecting it to the rod or bar *n*; *s t*, the supports for the sliding bar *l*; *u*, the adjustable bearing for the lower of the upper rollers of the elevator; *v*, the curved plate at the foot of elevator over the front bearing of the roller I; *w*, journal-bearings of the roller I; *x*, the plate or catch for holding the bar *e* in place and preventing it from rising.

The parts A, B, C, D, E, F, G, G′, and H may be of any of the ordinary forms of construction, and the complete machine is to be provided with a drive-wheel, sickle, divider, grain-wheel, and suitable gearing for operating the several parts; but as these parts may be of any of the usual forms of construction, they are neither shown nor described.

The lower elevator-roller, J, is suitablly journaled, near the lower end of the elevator, in the pieces B of the elevator-frame. Between this roller J and the inner roller of the carrier-platform is another roller, I, so located and arranged as to permit and aid the passage of the grain from the carrier-platform to the proper position to be taken by the elevating belts or devices, and prevent the grain from falling through at that point. This roller, as shown, is journaled in suitable bearings *w*, secured to the main frame A, and its shaft I′ projects some distance beyond the rear of the frame, and is provided with a pulley, U, by means of which the roller is driven. The roller J is so arranged in relation to this interposed roller I that the teeth *a* of the elevating-belts M will just clear the roller I.

The shaft J′of the roller J extends beyond the elevator-frame, and is provided with a pulley, V, for driving the roller J.

The elevating-belts M pass over the roller J at the bottom and over the rollers K L at the top of the elevator-frame. These belts M are provided with teeth or pins *a* for engaging with and elevating the grain, and by passing the belts over two rollers, K L, at the top, as shown, instead of one, a positive downward movement is given to the grain, which greatly facilitates its delivery upon the receiving-table or grain-receptacle.

The receiving-table P, as shown, is located on the cross-bars D, and to it is secured a curved piece of metal, O, so arranged as to prevent the grain on the table from falling back into the machine beneath the elevator. To this curved piece of metal O are secured springs or fingers N, so arranged and formed as to extend up and over the lower one of the upper elevator-rollers, L, the object of which fingers is to prevent the grain from going between the two upper rollers, and also to insure its delivery to the binder.

The butt-elevator belt is provided with suitable teeth *b*, and is located on top of the forward piece, B, of the elevator-frame, and is supported and driven by two pulleys, *c d*, which have their faces or sides parallel with the top of the piece B. These pulleys *c d* are connected together by the piece *e*. This piece *e* may be located in a groove, *e′*, formed in the piece B, which groove is of such form as to permit the piece *e* to move backward and forward, or may be located directly on top of the piece B. The shaft *c′* of the wheel *c* has its lower bearing in the piece B and its upper one in the cap or bent-up bar *f*, which bar or cap is permanently secured, as shown, to the bar or strap *e*. The shaft *c′* also forms a pivot for the bar or strap *e* to swing on. The upper bearing for the shaft *d′* of the pulley *d* is in the bent-up portion or cap *f′* of the strap *e*, and to the lower end of this shaft *d′* is secured a miter-wheel, *g*, which gears with a similar miter-wheel, *h*, secured to the shaft W of the roller K. On the shaft W, and sliding thereon, is a piece of metal, *i*, so

formed as to have two arms parallel to each other and a connecting-piece. The arms of this piece *i* are located on the shaft W, and between them is the wheel *h*, so that this piece *i* is above and on each side of the wheel *h*, and forms a guard therefor, to prevent any grain from becoming entangled therein. In the outer arm of this sliding head *i* is the journal-bearing for the lower end of the shaft *d'* of the pulley or wheel *d* for the upper end of the chain Q, so that as the head *i* is moved back and forth on the shaft the upper end of this belt Q must be carried with it, by reason of the journal-bearing for the shaft *d'* being in the sliding head.

By locating the wheel *h* between the arms of the sliding head and journaling the wheel *g* thereto, as shown and described, it will be seen that the wheels *g h* must be in gear, no matter what the position of the upper end of Q may be.

The inner arm of the sliding head *i* extends some distance below the shaft W, and enters a suitable guideway in the support or frame *j*. As shown, this arm passes between a pin, *k*, secured to *j* near its middle, and ears or projections formed on the edge of *j* at the top and bottom, so that this arm can slide up and down to some extent, but has no lateral play.

The guide or support *j* is permanently secured to the bar *l*, which bar moves forward and back in the bearings or guides *s t*, one of which, *s*, is secured to the piece B, and the other, *t*, to the backing M' of the elevator. To the inner end of this bar *l* is pivoted, at *m*, a bar or rod, *n*, which extends across the elevator and projects some distance beyond the elevator-frame, and to its outer end is pivoted, at *r*, the lever *o*, which lever is supported on a bracket, *q*, attached to the piece B, and is held in place thereon by the pivot *p*.

The roller L is journaled in adjustable bearings *u*, secured to the pieces C of the elevator-frame, by means of which the belts M can be kept at the proper tension.

As shown, the forward bearing of the roller I is covered with a curved piece, *v*; but in practice this piece may be dispensed
18 with and the bearing so formed as to accomplish the same purpose of permitting the grain at that point to pass up so as to be reached by the teeth *b* of the belt Q.

The rollers G I J K L are to be driven by means of suitable belts and pulleys operated from the main or drive wheel.

It will be seen that as the lever *o* is moved to or from the driver it will carry the upper end of the elevator Q out or in, as desired, by reason of the connecting-rod *n*, sliding bar *l*, supporting frame or piece *j*, sliding head *i*, gear-wheels *g h*, and shaft *d'*, and as the upper end of the belt or elevator is carried in or out it will describe an arc of a circle, so that the pulley *d* will be carried up and down slightly, carrying with it the gear-wheel *g*. The sliding head *i* must, therefore, be so arranged and connected to the shaft W and the devices for sliding it that it will be self-adjustable, in order to allow the upper end of the elevator or belt Q to operate.

The cover for preventing the grain from being blown away as it is elevated consists of the board R and spring-arms S'. The board R is located over the belt or elevator Q, and is so arranged as to

keep the butts of the grain down, so that the belt can elevate them and at the same time permit their easy passage up the backing-board M′. To the lower end of this board R is secured a cross-piece, S, which is connected and supported from the driver's platform by means of spring-arms T. This arrangement permits the cover or arms S′ to yield according to the amount of grain being elevated.

The backing-board M′ is secured to and between the posts or pieces B in any suitable manner, and is so arranged as to permit the easy passage of the grain, the grain in its passage being between this backing-board M′ and the cover R S′. The front edge of this backing-board M′ is provided with an angular recess, M″, formed by cutting out a portion of its upper face, as shown in Figs. 2 and 5, so that the backing-board will not interfere with the swinging of the belt or elevator Q on its pivot.

The backing-board M′ might be so arranged as to dispense with the recess M″; but by using this recess M″ it permits the lower edge of the butt-elevator to come below the upper line of the backing-board, so as to insure its engagement with all the butts of the grain and prevent the grain from getting between the backing-board and butt-elevator.

The elevator or belt Q can be used with other forms of elevators than the one shown to accomplish the same results, the belt being so arranged in relation to such elevator as to run with its edge parallel with the upper face of the backing-board or elevator.

As shown, the frame or support for the elevator or belt Q is pivoted at the lower end of the elevator-frame and has its driving mechanism located at the upper end; but the driving mechanism may be located at the lower end of the belt Q or elevator, if desired.

As shown, the butt-elevator Q consists of a belt, Q, provided with suitable teeth *b*, operated by pulley-wheels; but a chain provided with teeth or not, operated by suitable sprocket-wheels at the upper and lower ends, might be used in place of the belt.

By arranging the pulleys *c d* so that their flat faces will be parallel with the top surface of the elevator-frame, the butt-elevator will be operated so that its face will strike against the end of the butts of the grain when elevating the butts; and by supporting the butt-elevator on a frame or support pivoted at its lower end and free to swing back and forth at its upper end, the elevator can be so adjusted as to cause the grain to be delivered at one point, no matter what the length may be, for as the butts are carried up by the elevator the grain will be forced back toward the middle of the elevator by reason of the belt or chain striking against the ends of the butts and forcing them back, so that by this arrangement of the butt-elevator it not only serves the purpose of elevating the grain, but also acts as means to cause the grain in its passage up the elevator to be carried back, so as to deliver it at one point, regardless of its length, the upper end of the butt-elevator being carried in or out as the grain is short or long.

For delivering long grain in proper position for binding purposes the belt or elevator Q is to be so arranged that its upper end will be over, or nearly over, the piece B, in which position the elevator will

operate on a line with, or nearly with, the front of the backing M′, and the grain will be carried up thereby, so as to deliver it at a point where it can be clasped and bound at or near the middle.

For delivering medium grain the upper end of the elevator Q is to be carried or swung over the backing or elevator the required distance, and then, as the grain is carried up the elevator, the action of the face of the elevator or belt striking the ends of the butts will force the grain back, as it ascends, toward the middle of the backing or elevator; and this carrying or forcing endwise of the grain will continue until it has reached the top of the elevator Q, when it is in proper position to be delivered at the same point as the long grain, so that it can be clasped or bound near or at the middle.

For delivering short grain the upper end of the elevator Q is carried still farther over the backing or elevator for the grain, which makes the angle at which it stands greater, and forces the grain, as it ascends, still farther back on the backing or elevator by the action of belt or elevator Q on the ends of the butts, so that short grain will be carried up the elevator and delivered at the same point as before, so that it can be clasped or bound at or near the middle.

The upper end of the elevator Q is shifted to bring it to the desired position to deliver long, medium, or short grain by the operator, who takes hold of the lever *o* and moves it toward or from the elevator-frame. As the upper end of the lever is moved away from the frame its lower end will be carried in, and, carrying with it the rod *n*, will slide the plate or bar *l* forward, carrying with it the support or frame *j*, with which the sliding head *i* is connected, which head will be moved forward on the shaft W, carrying with it the gears *g h*, and through the shaft *d*′, the upper end of the elevator Q, bringing the parts into the position shown in Fig. 2.

When the upper end of the lever *o* is carried toward the driver its lower end is carried out, carrying with it the rod *n* and sliding bar or plate *l* and frame or support *j*, which moves the sliding head *i* back on the shaft W, and with it the gears *g h*, and, through the shaft *d*′, carries the upper end of the elevator Q over the backing or elevator to any desired position to deliver the grain at a point where it can be clasped or bound at or near the middle.

By this arrangement the grain as it is being elevated will be carried back or endwise, so that the middle of the grain will always come to the same point, no matter what the length of the grain may be, and so that it will be delivered in such a position that a binder who stands at a given place or point can clasp the sheaf in the middle and bind it without the necessity of shifting his position to accommodate himself to the delivery of the grain, and by thus delivering all lengths of grain at a uniform point the ease with which it is bound is greatly facilitated; and in case an automatic or self binder is used, it can be arranged stationary at the point to bind the grain properly, and the grain will be carried up and delivered at that point, so as to enable it to be bound by the self-binder at or near the middle, so that all devices which are now used for the purpose of adjusting a self-binder to the position to enable

it to bind the grain properly are dispensed with, as the grain, whether long or short, will be delivered at the same point by shifting the upper end of the butt-elevator, as before described.

By this arrangement all the devices for effecting a fore-and-aft adjustment for binding purposes are dispensed with, and the same means employed for elevating the butts also afford the means for properly delivering the grain, and such delivery is effected during the transit of the grain up the elevator.

The elevator Q need not extend the entire length of the elevator, but may stop some distance below the upper elevator-roller, as the grain, after it is once forced to the proper point on the elevator, will be carried up and delivered in that condition.

In operation, the grain, as it falls upon the carrier-platform H, is carried forward to the roller I, which also being in motion carries the grain up over it, when it is received by the teeth *a* of the elevator-belts, and by the belts M carried up and delivered to the receiving platform or table.

As machines have been heretofore constructed, the grain as it passes to the foot of the elevator was liable to stop and accumulate at that point, which prevented the easy elevation of the grain. By interposing the roller I between the foot of the elevator and the end of the carrier, as shown, it will be seen that no grain can accumulate at that point, as the roller I will move it forward and over the roller under all circumstances, thus keeping the grain constantly in motion at the foot of the elevator, so that it cannot become tangled or accumulate and clog the elevator, and this roller I, by reason of its revolving, will also tend, to some extent, to straighten the grain before it is elevated, and it also prevents any grain from falling through at this point. This roller I is so located as not to interfere with the transit of the grain to the elevator from the carrier, and operates in such a manner as to facilitate such transit.

The butts of grain are heavier than the heads, and consequently lag behind unless some means are provided to make them move faster than the heads. In order to elevate the butts even with the heads the belt or elevator Q is so arranged that the teeth *b* will engage with the butts of the grain on the roller I and carry them up while the heads are being carried up by the elevator-belts M. The lower pulley, *c*, is to be so arranged that it will permit the teeth *b* on the elevator Q to clear the end of the roller and engage the butts, and this pulley *c* is located as close to the main frame as is possible and permit the operation of the butt-elevator, which location of the pulley brings the butt-elevator in position to enable it to catch any short grain, which short grain is liable to fall down and be caught by the heel of the sickle and clog the sickle. By locating the lower pulley, *c*, of the belt Q at the proper distance above the main frame A the teeth *b* on the elevator will come in contact with such short grain and force it forward onto the carrier-platform, thus keeping the heel of the sickle clear at this point.

As shown in the drawings, in Fig. 2, the belt or chain Q is in position for elevating long grain and delivering it at the proper

point for binding, in which position the lever *o* is carried away from the elevator. For elevating short grain and delivering it at the proper point, the operator takes hold of the lever *o* and pulls it toward the elevator-frame, which carries the upper end of the belt or chain Q over the elevator to the proper point for elevating short grain.

What I claim as new, and desire to secure by letters patent, is—

1. In combination with a harvester-elevator, a swinging elevator pivoted at its lower end and suitable devices for shifting its upper end, whereby the swinging elevator forms a means for elevating the butts of the grain and delivering grain of different lengths at the same point, substantially as specified.

2. The adjustable elevator or belt Q, having its pulleys or wheels arranged with their faces parallel with the upper surface of the main elevator, in combination with such main elevator, for carrying the butts up even with the heads, substantially as specified.

3. The adjustable elevator or belt Q, having its lower end, *c*, advanced in front of the line of grain travel, and arranged as described in relation to the main elevator, substantially as and for the purposes set forth.

4. The pivoted frame or bar *e*, supporting the elevator Q, in combination with the sliding bar *l*, rod *n*, and lever *o*, for adjusting the upper end of the belt, substantially as and for the purpose specified.

5. The shaft W, wheel *h*, and frame *i*, in combination with the gear-wheel *g* and pulley-wheel *d*, for driving the elevator and keeping the gear-wheels *g h* in gear, substantially as specified.

6. The elevator or belt Q, in combination with the inclined board R and main elevator, substantially as and for the purpose set forth.

In testimony that I claim the foregoing as my own I hereto affix my signature in presence of two witnesses.

WILLIAM F. OLIN.

Witnesses:

WILLIAM H. CALHOUN.
MERRITT GREENE, JR.

And afterwards, to wit, on the 7th day of September, A. D. 1885, came the defendants and filed in the clerk's office their separate answers to the bill of complaint herein in the words and figures following, to wit:

22 In the Circuit Court of the United States for the District of Minnesota.

| | |
|---|---|
| WILLIAM DEERING<br>*vs.*<br>THE WINONA HARVESTER WORKS, C. L. BONNER, J. J. RANDALL, CASPER F. SEARCH, and C. H. PORTER. | In Equity. |

*Answers of Defendants as Amended.*

The answer of The Winona Harvester Works, of the city of Winona, in the State of Minnesota, to the two bills of complaint of William Deering, of Chicago, Illinois, filed, respectively, on the fifth day of May, 1885, and the tenth day of June, 1885, and consolidated into one suit by order of court dated June 19, 1885.

This defendant, now and at all times hereafter saving and reserving to itself all and all manner of benefit or advantage of exception or otherwise that can or may be had or taken to the many errors, uncertainties and imperfections in the said bills of complaint contained, for answer thereto, or to so much thereof as this defendant is advised it is material or necessary for it to make answer to, answering says:

I. It has been informed, and believes it to be true, that let-
23 ters patent of the United States, No. 278,639, dated May 29, 1883, were issued to the said complainant, as the assignee of one John W. Webster, of Chicago, Illinois, for alleged new and useful improvements in grain-binders, purporting to grant to the said complainant, his heirs and assigns, for the term of seventeen years from said date, the full and exclusive right of making, using and vending to others to be used the alleged invention therein described, and that before the issuing of the said letters patent the said John W. Webster sold, assigned and transferred to the said complainant all of the said Webster's alleged right, title and interest whatsoever in and to the said alleged invention.

II. But this defendant denies, on information and belief, that the said John W. Webster was the original and first inventor of the alleged invention and improvements set forth in the said letters patent.

III. It has been informed, and believes it to be true, that letters patent of the United States, No. 301,190, dated July 1, 1884, were issued to the said complainant, as the assignee of one John W. Webster, of Chicago, Illinois, for alleged new and useful improvements in cord-holding mechanism for grain-binders, purporting to grant to the said complainant, his heirs and assigns, for the term of seventeen years from said date, the full and exclusive right of making, using and vending to others to be used the alleged invention therein described, and that before the issuing of the said letters patent the said John W. Webster sold, assigned and transferred to the said complainant all of the said Webster's alleged right, title and interest whatsoever in and to the said alleged invention.

IV. But this defendant denies, on information and belief,
24 that the said John W. Webster was the original and first inventor of the alleged invention and improvements set forth in the said letters patent.

V. It charges, on information and belief, that the said letters patent No. 278,639 are void, for that the mechanism shown, described and claimed therein is inoperative for any useful purpose.

VI. It charges, on information and belief, that the said letters patent No. 278,639 and No. 301,190 are void, for that whatever of invention there may have been in the mechanism shown, described and claimed in the said letters patent, or either of them, was made, not by John W. Webster, the said patentee, but by Casper F. Search, one of the defendants herein.

VII. It has no knowledge, save from the said bill of complaint, that the said complainant is now the sole and exclusive owner of the said letters patent Nos. 278,639 and 301,190, and of all and singular the exclusive rights and privileges secured thereby, and is now entitled to sue for, and receive for his own use, all damages and profits arising out of or occasioned by infringements thereof, but leaves the said complainant to make such proof thereof as he may deem necessary.

VIII. It admits that it is engaged in the manufacture of grain-binders at Winona, in the State of Minnesota, and that in the grain-binders which it manufactures and sells it employs cord-holding devices; but it denies on information and belief that the cord-holding devices which it employs are an infringement of any rights secured to the said complainant, by virtue of the said letters patent Nos. 278,639 and 301,190.

IX. It denies that great or any injury whatsoever has resulted to the complainant, and that great or any gains or profits have
25 accrued to it which in equity belong to the complainant, and should be accounted for by it and paid over to the complainant, or that it has in any manner or way whatsoever deprived the said complainant of any gains or profits properly belonging to him which he would otherwise have derived had it not been for its actings and doings.

X. It charges, on information and belief, that the claims of the said letters patent Nos. 278,639 and 301,190 are invalid, for that they do not set forth complete and operative combinations.

XI. And this defendant, further answering, says, on information and belief, that the devices patented in said letters patent Nos. 278,639 and 301,190, and every substantial and material part thereof claimed therein as new, were, prior to the alleged or any invention or discovery thereof, or of any substantial or material part thereof, by the said John W. Webster, shown, described and patented in the following letters patent of the United States, to wit:

No. 236,898, granted to Sylvanus D. Locke for a harvester binder, January 25, 1881.

No. 238,939, granted to Sylvanus D. Locke, for a harvester binder, March 15, 1881.

No. 251,447, granted to Sylvanus D. Locke, for a harvester binder, Dec. 27, 1881.

No. 252,482, granted to Sylvanus D. Locke, for a grain-binder, January 17, 1882.

No. 222,416, granted to Leander J. McCormick, for an improvement in grain-binders, Dec. 9, 1879.

No. 252,854, granted to Charles M. Young, for a harvesting machine, Jan. 24, 1882.

No. 263,545, granted to Sylvanus D. Locke, for a harvester, Aug. 29, 1882.

26 No. 276,448, granted to Lewis Miller, for a grain-binding harvester, April 24, 1883.

No. 276,449, granted to Lewis Miller for a harvester, April 24, 1883.

No. 237,135, granted to James R. Severance, for a grain-binder, Feb. 1, 1881.

No. 69787, granted to L. B. Flanders, for a device for transmitting rotary motion, Oct. 15, 1867.

No. 257,837, granted to John F. Appleby, for a grain-binder, May 16, 1882.

No. 262,883, granted to John F. Appleby, for a grain-binder, Aug. 15, 1882.

No. 8862 (reissue), granted to Sylvanus D. Locke, for a machine for cutting and binding grain, Aug. 19, 1879.

No. 83910, granted to Antoine Bonnaz, for an improvement in sewing machines for embroidering, Nov. 10, 1868.

No. 269,400, granted to Thomas C. Entwistle, for a warping or beaming machine, Dec. 19, 1882.

No. 173,045, granted to G. W. Nichols, for a grain-binder, Feb. 1, 1876.

No. 189,165, granted to G. B. Withington, for a grain-binder, April 13, 1877.

Also in the following printed publications:

Appleton's Encyclopedia of Mechanics, title, Gearing.

Spon's Dictionary of Engineering, titles, Gearing and Mechanical Movements.

Also in the following British patents, relating to harvesters:

No. 523, of 1861, to Tolhausen.

No. 2638, of 1877, to King.

27 No. 5297, of 1878, to Evans & King.

XII. It charges, on information and belief, that the said alleged improvements described and claimed in the said patents Nos. 278,639 and 301,190 were in public use and on sale in the United States, for more than two years prior to the dates of his applications for letters patent of the United States therefor, and is advised that by reason thereof the said letters patent are void.

XIII. It is advised, and so charges, that the said letters patent Nos. 278,639 and 301,190 are void, for that in view of the state of the art at and prior to the dates of the said alleged inventions by the said John W. Webster, it required no invention to produce the same,

and that the alleged improvements therein claimed are not patentable inventions or improvements within the meaning of the law.

XIV. It has been informed, and believes it to be true, that letters patent of the United States No. 191,264, dated May 29, 1877, were issued to Elijah H. Gammon and William Deering (the complainant herein) as the assignees of John F. Steward, for an alleged new and useful improvement in grain-binders, purporting to grant to the said Gammon and Deering, their heirs and assigns, for the term of seventeen years from said date, the full and exclusive right of making, using and vending to others to be used, the alleged invention therein described, and that before the issuing of the said letters patent, the said John F. Steward sold, assigned and transferred to the said Gammon and Deering, all of the said Steward's alleged right, title and interest whatsoever in and to the said alleged invention.

28 XV. But it has no knowledge, save from the said bill of complaint, that afterwards, or at any time, the said Elijah H. Gammon, by an instrument in writing, duly executed and recorded, sold, assigned and transferred to the said William Deering, complainant herein, all his, the said Gammon's, right, title and interest in and to the said letters patent No. 191,264, and in and to all and singular the alleged exclusive rights and privileges secured thereby, but leaves the said complainant to make such proof thereof as he may deem necessary.

XV*a*. It avers that the said letters patent No. 191,264 do not exhibit a successful and practically operative machine, and are therefore void, and that the alleged improvements therein claimed are not, as therein shown, of practical utility, and have never been in practical use, but have been abandoned as worthless.

XVI. It denies, on information and belief, that the said John F. Steward was the original and first inventor of the alleged invention and improvements set forth in the said letters patent, or of any new and useful improvement in grain-binders that was not known or used by others before the date of his alleged invention, and which had not, at the time of his application for a patent therefor, been in public use and on sale in the United States for more than two years prior thereto.

XVI*a*. It avers, on information and belief, that the said letters patent No. 191,264, issued to Elijah H. Gammon and William Deering, as assignees of John F. Steward, May 29, 1877, expired before the commencement of this suit, for the reason that a prior patent for the same invention was granted to the said Steward in the Dominion of Canada on the 21st day of February, 1877, No.

29 7122, for a term of five years, which patent expired long prior to the commencement of this suit, and prior to the manufacture, uses and sales complained of.

XVI*b*. It says, upon information and belief, that the said prior Canadian letters patent No. 7122 were forfeited and expired by operation of law long prior to the expiration of their original term, and prior to the manufacture, uses and sales complained of, by reason of the open, notorious and public importation from the

United States into Canada, for sale in the said latter country, by complainant and those acting by his authority, with the knowledge and acquiescence of the said Steward, and by others, without objection from him, of machines embodying the alleged invention purporting to be patented therein, and by reason of failure of the patentee or his assigns to manufacture the said alleged invention in Canada within the period of two years from the date of said patent No. 7122, wherefore said subsequent letters patent No. 191,264 of the United States were also forfeited, and expired by operation of law, it being provided by the existing patent act of Canada, to wit: 35th Victoria, chap. 26, sec. 28, that such importation and failure to manufacture shall cause all rights and privileges granted under letters patent to cease and determine and render said patent null and void.

XVI*c*. It says, upon information and belief, that said letters patent No. 191,264 are now, and ever have been, invalid, for the reason that they were not, when issued, so limited as to expire at the same time with said foreign patent, granted by the Dominion of Canada to the said Steward for the said invention.

XVI*d*. It says, as to the said letters patent No. 191,264, that the complainant has no grounds for relief in equity, for the
30 reason that they had expired by operation of law long prior to the commencement of this suit.

XVII. It denies, on information and belief, that it has in any manner or way whatsoever violated or infringed the said letters patent No. 191,264, or any legal or equitable rights secured to the said complainant by reason of said letters patent, or that it intends so to do, either by manufacturing, selling, using or otherwise, grain-binders, containing or embodying, or having on them as a part thereof, the alleged improvements and inventions described in said letters patent No. 191,264, and mentioned in any of the claims thereof.

XVIII. It denies, on information and belief, that the grain-binders manufactured and sold by it in any manner whatsoever infringe the said letters patent No. 191,264, or that it is using or ever has used the said alleged invention, patented as aforesaid, or that any actings or doings of this defendant work or have worked any injury to the said complainant, or deprive or ever have deprived the said complainant of any gains or profits which he has or had any right to receive on account of the said alleged invention.

XIX. It is informed, and understands it to be the fact, though not stated in the bill of complaint, that it is charged with infringing only one claim of the said letters patent No. 191,264, to wit: The fifth claim thereof.

XX. It charges, on information and belief, that the said fifth claim, and other claims, of the said letters patent No. 191,264 are void, for that the alleged inventions, and the same principles and combinations, or every substantial and material part thereof, shown,
described and claimed therein as new, were, prior to the date
31 of the application for said letters patent, and the date of the said alleged invention by the said John F. Steward, shown,

described or claimed in the following letters patent of the United States, to wit:

No. 91282, granted to Ole O. Storle, for an improvement in grain-binders, June 15, 1869.

No. 146,526, granted to John H. Gordon, for an improvement in harvesters, January 20, 1874.

No. 159,506, granted to Marquis L. Gorham, for an improvement in grain-binders, February 9, 1875.

No. 181,664, granted to Thadeus Fowler, for an improvement in grain-binders, Aug. 29, 1876.

No. 181,954, granted to William Lottridge, for an improvement in grain-binders, Sept. 5, 1876.

No. 191,929, granted to John E. Buxton for an improvement in grain-binders, June 12, 1877.

No. 151,967, granted to James F. Gordon, for an improvement in grain-binders, June 16, 1874.

No. 155,781, granted to Pascal Whitney and Newel Whitney, for an improvement in grain-binders, Oct. 6, 1874.

No. 9930, granted to Watson and Renwick, for an improvement in grain harvesters and binders, December 6, 1853.

No. 40463, granted to S. A. Cummings for a harvester rake, Nov. 3, 1863.

No. 87263, granted to J. H. Jones, for an improvement in harvesters, Feb. 23, 1869.

No. 122,750, granted to J. H. Whitney for an improvement in harvesters, Jan. 16, 1872.

No. 32317, granted to A. B. Smith, for an improvement in harvesters, May 14, 1861.

No. 103,673, granted to G. H. Spalding, for an improvement in grain-binders, May 31, 1870.

32 No. 155,781, granted to J. H. Whitney, for an improvement in grain-binders, Oct. 6, 1874.

No. 168,120, granted to J. H. Whitney for an improvement in grain-binders, Sept. 28, 1875.

No. 149,233, granted to S. D. Locke for an improvement in grain-binders, March 31, 1874.

No. 31402, granted to Stephen Reynolds, for an improvement in grain-binders, Feb. 12, 1861.

No. 55440, granted to Richard Hornsby, for an improvement in reapers, Jan. 5, 1866.

Also in the following British patents:

No. 2638, of 1877, to King.

No. 3585, of 1877, to Whitworth.

XX*a*. It says that the said alleged improvements, described and purporting to be embraced in said letters patent No. 191,264, or every substantial and material part thereof, were, prior to the alleged invention thereof by said Steward, and more than two years prior to his application for a patent therefor, known to and publicly used by John H. Gordon, of Rochester, New York, Edward McElroy and James McNab, of Kalamazoo, Michigan, and others at and near Kalamazoo, Michigan, and elsewhere.

XXI. This defendant, further answering, says, on information and belief, that a construction substantially identical with the construction employed by it is shown and described in letters patent of the United States, No. 212,420, granted to John F. Appleby, for a grain-binding harvester, Feb. 18, 1879, and that the application of the said Appleby patent was pending in the United States Patent Office at the same time with the application of the said patent No. 191,264, but that no interference was declared by the Patent
33 Office between the two applications, and that the two devices appear, therefore, not to have been regarded by the Patent Office as the equivalents of each other.

XXII. It charges, on information and belief, that the said alleged improvements described in said letters patent No. 191,264, and claimed in the fifth claim and other claims thereof, were in public use and on sale in the United States for more than two years prior to the date of his application for letters patent therefor, and is advised that, by reason thereof, the said letters patent are void.

XXIII. It is advised, and so charges, that the said patent No. 191,264, is void to the extent of the said fifth claim, and other claims, for that in view of the state of the art at and prior to the date of the said alleged invention by the said John F. Steward, it required no invention to produce the same, and that the alleged improvements are not patentable inventions or improvements within the meaning of the law.

XXIV. It has been informed and believes it to be true, that letters patent of the United States, No. 223,812, dated January 27, 1880, were issued to one William F. Olin for an alleged improvement in harvesters, purporting to grant to the said Olin, his heirs and assigns, for the term of seventeen years from said date, the full and exclusive right of making, using and vending to others to be used the alleged invention therein described.

XXV. But it has no knowledge, save from the said bill of complaint, that afterwards, or at any time, the said William F.
34 Olin, by an instrument in writing, duly executed and recorded, sold, assigned and transferred to William Deering, the complainant herein, all his, the said Olin's right, title and interest in and to the said letters patent No 223,812, and in and to all and singular the alleged exclusive rights and privileges secured thereby, but leaves the complainant to make such proof thereof as he may deem necessary.

XXVI. It denies, on information and belief, that the said William F. Olin was the original and first inventor of the alleged invention and improvements set forth in the said letters patent, or of any new and useful improvement in harvesters that was not known or used by others before the date of his alleged invention, and which had not, at the time of his application for a patent therefor, been in public use and on sale in the United States for more than two years prior thereto.

XXVII. It denies, on information and belief, that it has in any manner or way whatsoever violated or infringed the said letters patent No. 223,812, or any legal or equitable rights secured to the

said complainant by reason of the said letters patent, or that it intends so to do, either by manufacturing, selling, using, or otherwise, grain-binding harvesters containing, or embodying, or having on them as a part thereof, the alleged improvements and inventions described in said letters patent No. 223,812, and mentioned in any of the claims thereof.

XXVIII. It denies, on information and belief, that the grain-binding harvesters manufactured and sold by it in any manner whatsoever infringe the said letters patent No. 223,812, or that it is using or ever has used the said alleged invention, patented as aforesaid, or that any actings or doings of this defendant work
35 or have worked any injury to the said complainant, or deprive or ever have deprived the said complainant of any gains or profits which he has or had any right to receive on account of the said alleged invention.

XXIX. It is informed, and understands it to be the fact, though not stated in the bill of complaint, that it is charged with infringing only three claims of the said letters patent No. 223,812, to wit: the first, second and third claims thereof.

XXX. It charges, on information and belief, that the said first, second and third claims, and other claims, of the said letters patent No. 223,812 are void, for that the alleged inventions and the same principles and combinations, or every substantial and material part thereof, shown, described and claimed therein as new, were, prior to the date of the application for said letters patent and the date of the said alleged invention by the said William F. Olin, shown, described or claimed in the following letters patent of the United States, to wit:

No. 9930, granted to Watson and Renwick, for a harvester and binder, Dec. 6, 1853.

No. 48363, granted to Robert D. Brown, for an improvement in binding attachments to harvesters, June 27, 1865.

No. 52175, granted to Israel Lancaster, for an improvement in grain-binders, January 23, 1866.

No. 7491, (reissue), granted to Israel Lancaster, for an improvement in grain-binders, February 6, 1877.

No. 188,125, granted to George F. Green, for an improvement in grain-binders, March 6, 1877.

No. 177,231, granted to John H. Elward, for an improvement in harvesters, May 9, 1876.

No. 9179, (reissue), granted to John H. Elward, for an improvement in harvesters, April 27, 1880.

36 No. 192,150, granted to Edwin Chapman, for an improvement in grain-binders, June 19, 1877.

No. 192,151, granted to Edwin Chapman, for an improvement in grain-binders, June 19, 1877.

No. 193,112, granted to John H. Elward, for an improvement in harvesters, July 17, 1877.

No. 193,637, granted to Harry H. Bridenthal, Jr., for an improvement in grain-binders, July 31, 1877.

No. 210,520, granted to James F. Gordon, for an improvement in grain-binders, Dec. 3, 1878.

No. 120,828, granted to Moses T. Ridout, for an improvement in grain-binders, Nov. 14, 1871.

No. 160,895, granted to Marquis L. Gorham, for an improvement in harvesters, March 16, 1875.

No. 41080, granted to C. W. and W. W. Marsh, for an improvement in raking device for harvesters, January 5, 1864.

No. 45642, granted to J. Seibel, for an improvement in harvesters, Dec. 27, 1864.

No. 54672, granted to J. Barta, for an improvement in grain-binders, May 15, 1866.

No. 165,316, granted to J. H. Elward, for an improvement in harvesters, July 6, 1875.

No. 196,386, granted to W. J. Powell, for an improvment in cotton-harvesters, Oct. 23, 1877.

No. 89906, granted to W. L. Williams, for a wood-splitting machine, May 11, 1869.

No. 149,233, granted to S. D. Locke, for an improvement in grain-binders, March 31, 1874.

No. 53981, granted to T. M. Howard, for a drilling machine, April 17, 1866.

No. 187,543, granted to C. W. and W. W. Marsh, for a harvester reel, Feb. 20, 1877.

37 No. 189,566, granted to C. W. and W. W. Marsh, for a harvester reel, April 17, 1877.

No. 86449, granted to Rank & Cox, for an improvement in harvesters, Feb. 2, 1869.

No. 46478, granted to I. S. Lauback, for a metal drill, Feb. 21, 1865.

No. 99803, granted to E. J. Worcester, for a metal drill, Feb. 15, 1870.

No. 127,132, granted to Worcester & Prentice, for a drilling machine, May 21, 1872.

Also in the following British patents:

No. 5088, of 1880, to Mainwaring.

No. 2275, of 1881, to Bamlett.

XXX*a*. It says as to the said letters patent No. 223,812, that the claims in the original application upon which said letters patent issued were required by the Commissioner of Patents to be limited as a prerequisite to the grant of the patent, and that such limitation was accepted by said Olin, and incorporated in the claims of his application by amendment, and that by said limitation the claims have been so restricted that they cannot be construed to cover any device or combination heretofore or at any time manufactured by the defendant herein.

XXX*b*. It says that said alleged improvements described and purporting to be embraced in said letters patent No. 223,812, or every substantial and material part thereof, were, prior to the alleged invention thereof, by said Olin, and more than two years prior to his application for a patent therefor, known to and publicly

used by John H. Elward, formerly of St. Paul, Minnesota, but now of White Water, Wis., at said St. Paul and elsewhere.

38 XXXI. It charges, on information and belief, that the said letters patent No. 223,812 are void, for that a prior patent, to wit: No. 211,862, dated Feb. 4, 1879, was granted to the said William F. Olin, which prior letters patent fully show and describe the alleged invention shown and described in the said letters patent No. 223,812 and claimed in the first three claims thereof; and it further charges, on information and belief, that the said letters patent No. 223,812 are void, for that the alleged invention therein shown, described and claimed is worthless and impracticable, and that the various combinations therein claimed as new, are totally inoperative for any useful and practical purpose.

XXXII. It charges, on information and belief, that the said alleged improvements described and claimed in the said letters patent No. 223,812 were in public use and on sale in the United States for more than two years prior to the date of his application for a patent therefor, and is advised that by reason thereof the said letters patent are void.

XXXIII. It is advised, and so charges, that the said letters patent No. 223,812 are void, for that in view of the state of the art at and prior to the date of the said alleged invention by the said William F. Olin, it required no invention to produce the same, and that the alleged improvements claimed therein are not patentable inventions or improvements within the meaning of the law.

XXXIV. It has been informed, and believes it to be true, that letters patent of the United States No. 251,147, dated Dec. 20,

39 1881, were issued to the said complainant, as the assignee of one John W. Webster, for alleged new and useful improvements in harvesters, purporting to grant to the said complainant, his heirs and assigns, for the term of seventeen years from said date, the full and exclusive right of making, using and vending to others to be used, the alleged invention therein described, and that before the issuing of the said letters patent the said John W. Webster sold, assigned and transferred to the said complainant all of the said Webster's alleged right, title and interest whatsoever in and to the said alleged invention.

XXXV. But this defendant denies, on information and belief, that the said John W. Webster was the original and first inventor of the alleged invention and improvements set forth in the said letters patent, or of any new and useful improvement in harvesters that was not known or used by others before the date of his alleged invention, or which had not at the time of his application for a patent therefor, been in public use and on sale in the United States for more than two years prior thereto.

XXXVI. It denies, on information and belief, that it has in any manner or way whatsoever violated or infringed the said letters patent No. 251,147, or any legal or equitable rights secured to the said complainant by reason of the said letters patent, or that it intends so to do, either by manufacturing, selling, using, or otherwise, harvesters containing, or embodying, or having on them as a

part thereof, the alleged improvements and inventions described in said letters patent No. 251,147 and mentioned in any of the claims thereof.

XXXVII. It denies, on information and belief, that the
40 grain-binding harvesters manufactured and sold by it in any manner whatsoever infringe the said letters patent No. 251,147, or that it is using or ever has used the said alleged invention, patented as aforesaid, or that any actings or doings of this defendant work or have worked any injury to the said complainant, or deprive or have deprived the said complainant of any gains or profits which he has or had any right to receive on account of the said alleged invention.

XXXVIII. It charges, on information and belief, that the said letters patent No. 251,147 are void, for that the alleged invention, and the same principles and combinations, or every substantial and material part thereof shown, described and claimed therein as new, were, prior to the date of the application for said letters patent and the date of the said alleged invention by the said John W. Webster, shown, described, or claimed in the following letters patent of the United States, to wit:

No. 973, (reissue), granted to L. J., W. S. & C. H. McCormick, for an improvement in reaping and mowing machine, June 5, 1860.

No. 41384, granted to John C. McDougal, for an improvement in harvesters, January 26, 1864.

No. 126,932, granted to Samuel Crawford, for an improvement in harvesters, May 21, 1872.

No. 134,610, granted to Geo. M. Patten for an improvement in adjustable grain wheels for harvester platforms, January 7, 1873.

No. 169,924, granted to Christian H. Salzman, for an improvement in grain wheel arms for harvesters, Nov. 16, 1875.

No. 178,127, granted to John H. Elward, for an improvement in harvesters, May 30, 1876.

41 No. 181,359, granted to Samuel Noxon, Jr., for an improvement in adjustments for harvester platforms, Aug. 22, 1876.

No. 185,873, granted to George Henry Spaulding, for an improvement in harvesters, January 2, 1877.

No. 241,498, granted to Christopher W. Levalley, for an improvement in harvesters, May 17, 1881.

No. 79575, granted to Samuel Johnston, for an improvement in harvesters, July 7, 1868.

No. 796, granted to J. Bacon, for a sash-fastener, June 20, 1838.

No. 90344, granted to G. Dare, for a bag-holder, May 25, 1869.

No. 206,974, granted to C. E. Sackett, for a cultivator, Aug. 13, 1878.

No. 86370, granted to A. E. Cruttenden, for a plow, Feb. 2, 1869.

No. 147,245, granted to L. W. Dickerson, for a cultivator, Feb. 10, 1874.

Also in the British patent to Mills, No. 2444, of 1868.

XXXIX. This defendant, further answering, says that letters patent to William K. Miller, No. 252,494, dated January 17, 1882, for a reaping machine, and No. 252,495, dated Jan. 17, 1882, for

means for adjusting the grain wheel of harvesting machines, were granted upon applications filed in the United States Patent Office prior to the filing of the application upon which the said letters patent 251,147 were granted, and that the said applications were all pending simultaneously; that the application of Webster and Miller were not regarded by the Patent Office as conflicting or interfering, and, that the device employed by this defendant corresponds more nearly in principle and mode of operation with the devices shown and described in the said patents to Miller than it does with the device shown and described in the said patent No. 251,147.

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XL. It charges, on information and belief, that the said alleged improvements, described and claimed in the said letters patent No. 251,147, were in public use and on sale in the United States for more than two years prior to the date of his application for a patent therefor, and is advised that by reason thereof the said letters patent are void.

XLI. It is advised, and so charges, that the said letters patent No. 251,147 are void, for that in view of the state of the art at and prior to the date of the said alleged invention by the said John W. Webster, it required no invention to produce the same, and that the alleged improvements claimed therein are not patentable inventions or improvements within the meaning of the law.

XLII. It has been informed, and believes it to be true, that letters patent of the United States, No. 266,913, dated October 31, 1882, were issued to Elijah H. Gammon and William Deering, (the complainant herein), as the assignees of John F. Steward, for alleged new and useful improvements in grain-binders, purporting to grant to the said Gammon and Deering, their heirs and assigns, for the term of seventeen years from the said date, the full and exclusive right of making, using, and vending to others to be used, the alleged invention therein described, and that before the issuing of the said letters patent the said John F. Steward sold, assigned and transferred to the said Gammon and Deering all of the said Steward's alleged right, title and interest whatsoever in and to the said alleged invention.

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XLIII. But it has no knowledge, save from the said bill of complaint, that afterwards, or at any time, the said Elijah H. Gammon, by an instrument in writing, duly executed and recorded, sold, assigned and transferred to William Deering, complainant herein, all his, the said Gammon's, right, title and interest in and to the said letters patent No. 266,913, and in and to all and singular the alleged exclusive rights and privileges secured thereby, but leaves the said complainant to make such proof thereof as he may deem necessary.

XLIV. It denies, on information and belief, that the said John F. Steward was the original and first inventor of the alleged invention and improvements set forth in the said letters patent, or of any new and useful improvement in grain-binders that was not known or used by others before the date of his alleged invention and which had not, at the time of his application for a patent therefor, been

in public use and on sale in the United States for more than two years prior thereto.

XLV. It denies, on information and belief, that it has in any manner or way whatsoever violated or infringed the said letters patent No. 266,913, or any legal or equitable rights secured to the said complainant by reason of the said letters patent, or that it intends so to do, either by manufacturing, using, selling, or otherwise, grain-binders, containing or embodying, or having on them as a part thereof, the alleged improvements and inventions described in said letters patent No. 266,913, and mentioned in any of the claims thereof.

44 XLVI. It denies, on information and belief, that the grain-binders manufactured and sold by it in any manner whatsoever infringe the said letters patent No. 266,913, or that it is using, or ever has used, the said alleged invention, patented as aforesaid, or that any actings or doings of this defendant work or have worked any injury to the said complainant, or deprive or ever have deprived the said complainant of any gains or profits which he has or had any right to receive on account of the said alleged invention.

XLVII. It is informed, and understands it to be the fact, though not stated in the bill of complaint, that it is charged with infringing only one claim of the said letters patent No. 266,913, to wit: the twenty-first claim thereof.

XLVIII. It is advised, and so charges, that the said twenty-first claim of the said letters patent No. 266,913 is void, for that it is for a combination of parts which formed no part of the invention of the said Steward at the time of filing his application for the said letters patent, and was not covered by the oath attached to the said application, but was inserted by amendment, without oath, nearly four years after the filing of the original application, and after the said combination had been in public use and on sale by others for more than two years.

XLIX. It charges, on information and belief, that the said twenty-first claim and other claims of the said letters patent No. 266,913 are void, for that the alleged inventions and the same principles and combinations, or every substantial and material part thereof shown, described and claimed therein as new, were, prior to the date of the application for said letters patent

45 and the date of the said alleged invention by the said John F. Steward, shown, described or claimed in the following letters patent of the United States, to wit:

No. 9930, granted to Watson and Renwick, for an improvement in grain harvesters and binders, December 6, 1853.

No. 28783, granted to Albia B. Smith, for an improvement in raking and binding apparatus for harvesters, June 19, 1860.

No. 103,861, granted to Thadeus Fowler, for an improvement in machines for binding grain, June 7, 1870.

No. 191,928, granted to John E. Buxton, for an improvement in grain-binders, June 12, 1877.

No. 250,915, granted to Mason Hedrick, for an aid-binder attachment for harvesters, December 13, 1881.

No. 260,115, granted to John D. Nix, for a grain-binder, June 27, 1882.

No. 260,634, granted to John F. Appleby, for a grain-binder, July 4, 1882.

No. 51599, granted to Sylvanus D. Locke, for an improvement in grain-binders, Dec. 19, 1865.

No. 158,466, granted to Stephen D. Carpenter, for an improvement in grain-binding harvesters, January 5, 1875.

No. 175,785, granted to Charles L. Travis, for an improvement in grain-binders, April 4, 1876.

No. 178,993, granted to John E. Buxton, for an improvement in grain-binders, June 20, 1876.

No. 188,125, granted to George F. Green, for an improvement in grain-binders, March 6, 1877.

No. 192,150, granted to Edwin Chapman, for an improvement in grain-binders, June 19, 1877.

No. 261,007, granted to F. T. and F. A. Lomont, for a grain-binder, July 11, 1882.

46 No. 261,594, granted to Fred. A. Dennet, for an attachment for grain-binders, July 25, 1882.

No. 263,370, granted to Cyrenus Wheeler, Jr., for a self-binding harvester, August 29, 1882.

No. 264,602, granted to John F. Appleby, for a grain-binder, Sept. 19, 1882.

No. 265,199, granted to Whitely & Thomas, for an improvement in self-binders, Sept. 26, 1882.

No. 53138, granted to William F. Goodwin, for an improvement in grain binders, March 13, 1866.

No. 75215, granted to A. S. Stone, for an improvement in grain-binders, March 3, 1868.

No. 191,096, granted to William R. Baker, for an improvement in grain-binders, May 22, 1877.

No. 205,067, granted to Lambert Erpelding, for an improvement in grain-binders, June 18, 1878.

No. 191,929, granted to John E. Buxton, for an improvement in grain-binders, June 12, 1877.

No. 209,149, granted to Charles L. Travis, for an improvement in grain-binders, Oct. 22, 1878.

No. 221,922, granted to Moses A. Keller, for an improvement in gleaning and grain-binding machines, Nov. 25, 1879.

No. 230,383, granted to Charles B. Withington, for a grain-binder, July 20, 1880.

No. 238,302, granted to Ferris Ogden, for a grain-binder, March 1, 1881.

No. 245,924, granted to Christopher W. Levally, for a grain-binder, August 16, 1881.

No. 256,357, granted to George B. Morton, for a grain-binder, April 11, 1882.

No. 200,544, granted to Moses A. Keller, for an improvement in grain-binders, Feb. 19, 1878.

47 No. 209,059, granted to Moses A. Keller, for an improvement in grain-binders, October 15, 1878.

No. 101,496, granted to J. Nolan, for a nail-plate feeder, April 5, 1870.

No. 81273, granted to W. Hoeft for a washing machine, Aug. 18, 1868.

No. 75051, granted to E. S. Pierce, for a connecting rod, March 3, 1868.

No. 197,547, granted to W. H. Field, for a nail-plate feeder, Nov. 27, 1877.

No. 192,034, granted to S. D. Tucker, for a paper-folding machine, June 12, 1877.

No. 30343, granted to E. Paye, for a power hammer, Oct. 9, 1860.

No. 107,717, granted to B. C. Pole, for a sewing-machine treadle, Sept. 27, 1870.

No. 128,981, granted to A. Shedlock, for a pitman, July 16, 1872.

No. 172,903, granted to R. Adams, for a pitman, Feb. 1, 1876.

No. 133,800, granted to A. A. Rheutan, for an envelope machine, Dec. 10, 1872.

No. 142,611, granted to J. H. Carothers, for a pitman, Sept. 9, 1873.

No. 120,290, granted to S. D. Locke, for a grain-binder, Nov. 28, 1871.

No. 186,056, granted to S. Miller, for a grain-binder, Jan. 9, 1877.

No. 126,520, granted to E. Chapman, for a grain-binder, May 7, 1872.

No. 150,050, granted to C. Jewell, for a grain-binder, April 21, 1874.

No. 97531, granted to S. D. Locke, for a grain-binder, Dec. 7, 1869.

48 No. 97533, granted to S. D. Locke, for a grain-binder, Dec. 7, 1869.

No. 121,290, granted to S. D. Locke, for a grain-binder, Nov. 28, 1871.

No. 81891, granted to J. B. Greenhut, for a grain-binder, Sept. 8, 1868.

No. 37408, granted to T. Palmer, for a grain-binder, Jan. 13, 1863.

Also in the following British patents:

No. 3436, of 1866, to Exall.

No. 4242, of 1877, to Fisken.

No. 2275, of 1881, to Bamlett.

No. 2629, of 1875, to Cranston.

No. 4745, of 1877, to Neale.

No. 4155, of 1878, to Woolnough & Kingsford.

No. 1417, of 1880, to " "

No. 3585, of 1877, to Whitworth.

XLIX*a*. It says that said alleged improvements described and purporting to be embraced in said letters patent No. 266,913, or every substantial and material part thereof, were, prior to the alleged invention thereof by said Steward, and more than two years prior to his application for a patent therefor, known to and pub-

licly used by George F. Green, of Kalamazoo, Michigan, at and near said Kalamazoo, and elsewhere; known to and publicly used by G. A. Houston and W. P. Smith, of Beloit, Wisconsin, at and near said Beloit, and elsewhere; known to and publicly used by Abel Hoover and William Gamble, of Miamisburg, Ohio, at and near said Miamisburg, and elsewhere; known to and publicly used by John F. Appleby, of Minneapolis, Minnesota, at and near said Minneapolis, and elsewhere; and known to and publicly used and sold
49 by Parker and Stone, of Beloit, Wisconsin, being Charles E. Parker and Gustavus Stone, of said town, at and near said Beloit, and elsewhere; which use and sale is known among others, to F. E. Adams, of said Beloit.

L. This defendant, further answering, says, on information and belief, that the application of the said John F. Steward upon which letters patent No. 266,913 were granted, was pending in the United States Patent Office for more than four years; that this great delay was owing largely to the laches of said Steward in prosecuting of the said application; that during the pendency of the said application, and before the amendment incorporating the said twenty-first claim was filed, various patents, cited in the foregoing section, showing combinations sought to be included by the said twenty-first claim, were passed upon and issued by the United States Patent Office, and that this defendant has reason to believe, and does believe, that it was the issuance of these said patents which suggested the said twenty-first claim to the said Steward.

*La.* It says further, that during the pendency of said application, and before the incorporation of said twenty-first claim, and, as defendant believes, more than two years before any application by said Steward on the subject-matter thereof, the devices now sought, to be covered by said claim had gone largely into public use, and among others, were manufactured, used and sold at Chicago, Illinois and elsewhere, by the McCormick Harvesting Machine Company, of said Chicago; and that this defendant has reason to believe, and does believe, and so charges, that said twenty-first claim was wrongfully procured to be inserted by said Steward or his assignees, with
50 a view to covering this construction after any right which he might otherwise have had in respect thereto was forfeited.

LI. It charges, on information and belief, that the said alleged improvements, described in said letters patent No. 266,913, and claimed in the twenty-first claim and other claims thereof, were in public use and on sale in the United States for more than two years prior to the date of said Steward's application for a patent therefor, and is advised that by reason thereof the said letters patent are void.

LII. It is advised, and so charges, that the said letters patent No. 266,913 are void, to the extent of the said twenty-first claim and other claims, for that in view of the state of the art at and prior to the date of the said alleged invention by the said John F. Steward, it required no invention to produce the same, and that the alleged

improvement is not a patentable invention or improvement within the meaning of the law.

LIII. It has been informed, and believes it to be true, that letters patent of the United States No. 272,598, dated February 20, 1883, were issued to one John F. Steward for an alleged improvement in grain-binders, purporting to grant to the said Steward, his heirs and assigns, for the term of seventeen years from said date, the full and exclusive right of making, using, and vending to others to be used, the alleged invention therein described.

LIV. But it has no knowledge, save from the said bill of complaint, that afterwards, or at any time, the said John F. Steward, by an instrument in writing, duly executed and recorded, sold, assigned and transferred to William Deering, the complainant
51 herein, all his, the said Steward's right, title and interest in and to the said letters patent No. 272,598, and in and to all and singular the alleged exclusive rights and privileges secured thereby, but leaves the complainant to make such proof thereof as he may deem necessary.

LV. It denies, on information and belief, that the said John F. Steward was the orignal and first inventor of the alleged invention and improvements set forth in the said letters patent, or of any new and useful improvement in grain-binders that was not known or used by others before the date of his alleged invention, and which had not, at the time of his application for a patent therefor, been in public use and on sale in the United States for more than two years prior thereto.

LVI. It denies, on information and belief, that it has in any manner or any way whatsoever violated or infringed the said letters patent No. 272,598, or any legal or equitable rights secured to the said complainant by reason of the said letters patent, or that it intends so to do.

LVII. It denies, on information and belief, that the grain-binding harvesters manufactured and sold by it in any manner whatsoever infringe the said letters patent No. 272,598, or that any actings or doings of this defendant work or have worked any injury to the said complainant, or deprive or ever have deprived the said complainant of any gains or profits which he has or had any right to receive on account of the said alleged invention.

LVIII. It is informed, and understands it to be the fact, though not stated in the bill of complaint, that it is charged with infringing only two claims of the said letters patents No. 272,598, to wit, the twentieth and twenty-first claims thereof.

52 LIX. It charges, on information and belief, that the said twentieth and twenty-first claims and other claims of the said letters patent No. 272,598 are void, for that the alleged inventions, and the same principles and combinations, or every substantial and material part thereof shown, described and claimed therein as new, were, prior to the date of the application for said letters patent and the date of the said alleged invention by the said John F. Steward shown, described or claimed in the following letters patent of the United States, to wit:

No. 274,772, granted to James Howard and Edward T. Bousfield, for a grain-binding machine, March 27, 1883. (The application for which was filed Dec. 12, 1881, prior to the filing by the said John F. Steward of his application upon which said patent No. 272,598 was granted.)

No. 120,828, granted to Moses T. Ridout, for an improvement in grain-binders, Nov. 14, 1871.

No. 226,865, granted to Christopher W. Levalley, for a grain-binder, April 27, 1880.

No. 236,577, granted to George F. Green, for a self-binding harvester, January 11, 1881.

No. 237,135, granted to James R. Severance, for a grain-binder, February 1, 1881.

No. 238,750, granted to Charles L. Travis, for a grain-binding machine, March 8, 1881.

No. 241,451, granted to Charles L. Travis, for a grain-binding machine, May 10, 1881.

No. 263,160, granted to Edwin S. Frost, for a grain-binding attachment for reapers, August 22, 1882.

No. 261,007, granted to F. T. and F. A. Lomont, for a grain-binder, July 11, 1882.

53 No. 268,357, granted to Henry J. Case, for a grain-binding harvester, Nov. 28, 1882.

No. 272,016, granted to Irving E. Arner, for an attachment for harvesters, February 13, 1883.

No. 262,026, granted to George Esterly, for a grain-binding harvester, August 1, 1882.

No. 266,937, granted to Whitely and Bailey, for a self-binder, Oct. 31, 1882.

No. 266,949, granted to Bullock and Appleby, for a grain-adjuster for harvester binders, Oct. 31, 1882.

No. 229,396, granted to Albert Goodyear, for a grain-binder, June 29, 1880.

No. 211,862, granted to W. F. Olin, for a harvesting machine, February 4, 1879.

No. 223,812, granted to W. F. Olin, for a harvester, January 27, 1880.

No. 9930, granted to Watson and Renwick, for a harvester and binder, Dec. 6, 1853.

No. 48363, granted to Robert D. Brown, for a binding attachment to harvesters, June 27, 1865.

No. 52175, granted to Israel Lancaster, for a grain-binder, January 23, 1866.

No. 7491, (reissue), granted to Israel Lancaster, for a grain-binder, February 6, 1877.

No. 188,125, granted to George F. Green, for an improvement in grain-binders, March 6, 1877.

No. 177,231, granted to John H. Elward, for an improvement in harvesters, May 9, 1876.

No. 9179, (reissue), granted to John H. Elward, for a harvester, April 27, 1880.

No. 192,150, granted to Edwin Chapman, for an improvement in grain-binders, June 19, 1877.

No. 192,151, granted to Edwin Chapman, for an improvement in grain-binders, June 19, 1877.

54 No. 193,112, granted to John H. Elward, for an improvement in harvesters, July 17, 1877.

No. 193,637, granted to Harry H. Bridenthal, Jr., for an improvement in grain-binders, July 31, 1877.

No. 210,520, granted to James F. Gordon, for an improvement in grain-binders, Dec. 3, 1878.

No. 248,401, granted to J. E. Buxton, for a grain-binder, Oct. 18, 1881.

Also in the following British patents:

No. 5088, of 1880, to Mainwaring.

No. 2275, of 1881, to Bamlett.

No. 4092, of 1881, to Howard and Bousfield.

LIX*a*. It says that the alleged improvements, described and purporting to be embraced in said letters patent No. 272,598, or every substantial and material part thereof, were prior to the alleged invention thereof by said Steward, and more than two years prior to his application for a patent therefor, known to and publicly used in the United States by Gottlieb Heller, of Dillon, Dickinson county, Kansas, at and near said Dillon and elsewhere; known to and publicly used by John E. Buxton, of Owatonna, Minnesota, at and near said Owatonna and elsewhere; known to and publicly used by George Esterly, of White Water, Wisconsin, at and near said White Water and elsewhere; known to and publicly used by Joseph P. Bullock, of Beloit, Wisconsin, at and near said Beloit and elsewhere; known to and publicly used by John F. Appleby, formerly of Beloit, Wisconsin, but now of Minneapolis, Minnesota, at and near said Beloit and elsewhere; known to and publicly used by the McCormick Harvesting Machine Company, of Chicago, Illinois, at and near said Chicago and elsewhere; known to and pub-

55 licly used by Edwin Chapman, of Rochester, Minnesota, at and near said Rochester and elsewhere; known to and publicly used by W. H. Joslyn, of Rochester, New York, in the county of Monroe, New York, and elsewhere; and known to and publicly used by John H. Elward, formerly of St. Paul, Minnesota, but now of White Water, Wisconsin, at and near said St. Paul and elsewhere.

LX. This defendant, further answering, says, on information and belief, that the said letters patent No. 272,598 were irregularly and improperly issued by the United States Patent Office, for that they were issued without interference with the applications of Howard and Bousfield and others, aforesaid, which were pending at the same time with the application of the said Steward, and showed, described and claimed the same devices that are shown, described and claimed in the said patent No. 272,598.

LXI. It charges, on information and belief, that the said alleged improvements, described and claimed in the said letters patent No. 272,598, were in public use and on sale in the United States for

more than two years prior to the date of said Steward's application for letters patent therefor, and is advised that, by reason thereof, the said letters patent are void.

LXII. It is advised, and so charges, that the said letters patent No. 272,598 are void, for that, in view of the state of the art at and prior to the date of the said alleged invention by the said John F. Steward, it required no invention to produce the same, and that the alleged improvements claimed therein are not patentable inventions or improvements within the meaning of the law.

LXIII. It has no knowledge, save from the bill of com-
56 plaint, that the said William Deering was, at the date of filing the said bill, or is now, or ever was, the sole and exclusive owner of the said letters patent No. 191,264, No. 223,812, No. 251,147, No. 266,913 and No. 272,598, and of all and singular the exclusive rights and privileges secured thereby, and entitled to sue for and receive to his own use all or any damages and profits arising out of or occasioned by infringement thereof, but leaves the complainant to make such proof thereof as he may deem necessary.

LXIV. It submits that the complainant is not entitled to the relief sought for in the said bills of complaint.

LXV. And it denies all and all manner of unlawful combination and confederacy with which it is by the said bills charged, without this, that there is any other matter, cause or thing in the said complainant's bills of complaint contained, material or necessary for it to make answer unto, and not herein and hereby well and sufficiently answered, confessed, traversed and avoided, or denied, is true, to the knowledge or belief of this defendant. All which matters and things it is ready and willing to aver, maintain and prove as this honorable court shall direct, and humbly prays to be hence dismissed with its reasonable costs and charges in this behalf most wrongfully sustained.

WINONA HARVESTER WORKS,
By DYRENFORTH & DYRENFORTH,
*Its Solicitors.*

57 In the Circuit Court of the United States for the District of Minnesota.

WILLIAM DEERING
*vs.*
THE WINONA HARVESTER WORKS, C. L. BONNER, J. J. RANDALL, CASPER F. SEARCH, and C. H. PORTER. } In Equity.

The separate answer of John J. Randall, of the city of Winona, in the State of Minnesota, to the two bills of complaint of William Deering, of Chicago, Illinois, filed, respectively, on the fifth day of May, 1885, and the tenth day of June, 1885, and consolidated into one suit by order of court dated June 19, 1885.

This defendant, now and at all times hereafter, saving and reserving to himself all and all manner of benefit or advantage of ex-

ception or otherwise that can or may be had or taken to the many errors, uncertainties and imperfections in the said bills of complaint contained, for his separate answer thereto, or to so much thereof as this defendant is advised it is material or necessary for him to make answer to, answering says:

I. As to all the allegations, denials, charges, defenses and admissions, so far as the said admissions may relate to him, contained in the answer of the Winona harvester works to the two bills
58 of complaint of William Deering, of Chicago, Illinois, filed, respectively, on the fifth day of May, 1885, and the tenth day of June, 1885, and consolidated into one suit by order of court, dated June 19, 1885, this defendant adopts the said answer of the said Winona harvester works, and, without repeating it, makes it a part of his separate answer herein.

II. He says that he is a stockholder of the said Winona harvester works, and that he is president of the said company.

III. But this defendant denies that he has ever personally or individually manufactured, sold or used for himself harvesters or binders containing, or embodying, or having on them as a part thereof, any of the alleged inventions or improvements shown, described or claimed in any of the letters patent named in the said bills of complaint, or that he has ever acted in any capacity in regard to the matters and things charged in the said bills of complaint other than as an agent, officer or stockholder of the said company.

IV. He denies the infringement charged in the said bills of complaint as to him, a separate defendant, and submits that as to him the said complainant is not entitled to the relief sought for in the said bills of complaint.

V. And this defendant denies all and all manner of unlawful combination and confederacy wherewith he is by the said bills charged, without this, that there is any other matter, cause or thing in the said complainant's said bills of complaint contained material or necessary for him to make answer unto, and not herein and hereby well and sufficiently answered, confessed, traversed and avoided, or denied, is true to the knowledge or belief of this
59 defendant. All which matters and things he is ready and willing to aver, maintain and prove as this honorable court shall direct, and humbly prays to be hence dismissed with his reasonable costs and charges, in this behalf most wrongfully sustained.

JOHN J. RANDALL,
By DYRENFORTH & DYRENFORTH,
*His Solicitors.*

60 In the Circuit Court of the United States for the District of Minnesota.

WILLIAM DEERING
*vs.*
THE WINONA HARVESTER WORKS, C. L. BONNER, J. J. RANDALL, CASPER F. SEARCH, and C. H. PORTER. } In Equity.

The separate answer of Casper F. Search, of the city of Winona, in the State of Minnesota, to the two bills of complaint of William Deering, of Chicago, Illinois, filed, respectively, on the fifth day of May, 1885, and the tenth day of June, 1885, and consolidated into one suit by order of court dated June 19, 1885.

This defendant, now and at all times hereafter, saving and reserving to himself all and all manner of benefit or advantage of exception or otherwise that can or may be had or taken to the many errors, uncertainties and imperfections in the said bills of complaint contained, for his separate answer thereto, and to so much thereof as this defendant is advised it is material or necessary for him to make answer to, answering says:

I. As to all the allegations, denials, charges, defenses and admissions, so far as the said admissions may relate to him, contained in the answer of the Winona harvester works to the two bills
61 of complaint of William Deering, of Chicago, Illinois, filed, respectively, on the fifth day of May, 1885, and the tenth day of June, 1885, and consolidated into one suit by order of court, dated June 19, 1885, this defendant adopts the said answer of the said Winona harvester works, and, without repeating it, makes it a part of his separate answer herein.

II. He says that he is not a stockholder or director of the said Winona harvester works, and that he does not hold and never has held any connection with the said Winona harvester works other than as an employé of the same.

III. He denies that he has ever personally or individually manufactured, sold or used for himself harvesters or binders containing, or embodying, or having on them as a part thereof, any of the alleged inventions or improvements shown, described and claimed in any of the letters patent named in the said bills of complaint, or that he has ever acted in any capacity in regard to the matters and things charged in the said bills of complaint other than as an agent or employé of the said company.

IV. He denies the infringement charged in the said bills of complaint as to him, a separate defendant, and submits that as to him the said complainant is not entitled to the relief sought for in the said bills of complaint.

V. And this defendant denies all and all manner of unlawful combination and confederacy wherewith he is by the said bills charged, without this, that there is any other matter, cause or thing in the said complainant's said bills of complaint contained material or necessary for him to make answer unto, and not herein

and hereby well and sufficiently answered, confessed, trav-
62 ersed and avoided, or denied, is true to the knowledge or belief of this defendant. All which matters and things he is ready and willing to aver, maintain and prove as this honorable court shall direct, and humbly prays to be hence dismissed with his reasonable costs and charges, in this behalf most wrongfully sustained.

CASPER F. SEARCH,
By DYRENFORTH & DYRENFORTH,
*His Solicitors.*

63 In the Circuit Court of the United States for the District of Minnesota.

WILLIAM DEERING
*vs.*
THE WINONA HARVESTER WORKS, C. L. BONNER, J. J. RANDALL, CASPER F. SEARCH, and C. H. PORTER. } In Equity.

The separate answer of Charles H. Porter, of the city of Winona, in the State of Minnesota, to the two bills of complaint of William Deering, of Chicago, Illinois, filed, respectively, on the fifth day of May, 1885, and the tenth day of June, 1885, and consolidated into one suit by order of court dated June 19, 1885.

This defendant, now and at all times hereafter, saving and reserving to himself all and all manner of benefit or advantage of exception or otherwise that can or may be had or taken to the many errors, uncertainties and imperfections in the said bills of complaint contained, for his separate answer thereto, or to so much thereof as this defendant is advised it is material or necessary for him to make answer to, answering says:

I. As to all the allegations, denials, charges, defenses and admissions, so far as the said admissions may relate to him, contained in the answer of the Winona Harvester Works to the two bills
64 of complaint of William Deering, of Chicago Illinois, filed, respectively, on the fifth day of May, 1885, and the tenth day of June, 1885, and consolidated into one suit by order of court, dated June 19, 1885, this defendant adopts the said answer of the said Winona Harvester Works, and, without repeating it, makes it a part of his separate answer herein.

II. He says that he is a stockholder of the Winona Harvester Works, and that he is a director of the said company.

III. But this defendant denies that he has ever personally or individually manufactured, sold or used, for himself, harvesters or binders containing or embodying or having on them as a part thereof any of the alleged inventions or improvements shown, described or claimed in any of the letters patent named in the said bills of complaint, or that he has ever acted in any capacity in regard to the matters and things charged in the said bills of com-

plaint other than as an agent, officer, or stockholder of the said company.

IV. He denies the infringement charged in the said bills of complaint as to him, a separate defendant, and submits that as to him the said complainant is not entitled to the relief sought for in the said bills of complaint.

V. And this defendant denies all and all manner of unlawful combination and confederacy wherewith he is by the said bills charged, without this, that there is any other matter, cause or thing in the said complainant's said bills of complaint contained, material or necessary for him to make answer unto and not herein and hereby well and sufficiently answered, confessed, traversed and avoided, or denied, is true to the knowledge or belief of this defendant. All which matters and things he is ready and willing to aver,
65 maintain and prove as this honorable court shall direct, and humbly prays to be hence dismissed with his reasonable costs and charges, in this behalf most wrongfully sustained.

CHARLES H. PORTER,
By DYRENFORTH & DYRENFORTH,
*His Solicitors.*

66 In the Circuit Court of the United States for the District of Minnesota.

WILLIAM DEERING
*vs.*
THE WINONA HARVESTER WORKS, C. L. BONNER, J. J. RANDALL, CASPER F. SEARCH, and C. H. PORTER. } In Equity.

The separate answer of Charles L. Bonner, of the city of Winona, in the State of Minnesota, to the two bills of complaint of William Deering, of Chicago, Illinois, filed, respectively, on the fifth day of May, 1885, and the tenth day of June, 1885, and consolidated into one suit by order of court dated June 19, 1885.

This defendant, now and at all times hereafter, saving and reserving to himself all and all manner of benefit or advantage of exception or otherwise that can or may be had or taken to the many errors, uncertainties and imperfections in the said bills of complaint contained, for his separate answer thereto, or to so much thereof as this defendant is advised it is material or necessary for him to make answer to, answering says:

I. As to all the allegations, denials, charges, defenses and admissions, so far as the said admissions may relate to him, contained in the answer of the Winona Harvester Works to the two bills
67 of complaint of William Deering, of Chicago, Illinois, filed, respectively, on the fifth day of May, 1885, and the tenth day of June, 1885, and consolidated into one suit by order of court, dated June 19, 1885, this defendant adopts the said answer of the said Winona Harvester Works, and, without repeating it, makes it a part of his separate answer herein.

II. He says that he is a stockholder of the said Winona Harvester Works, and that he is president of the said company.

III. But this defendant denies that he has ever personally or individually manufactured, sold or used, for himself, harvesters or binders containing or embodying or having on them as a part thereof any of the alleged inventions or improvements shown, described or claimed in any of the letters patent named in the said bills of complaint, or that he has ever acted in any capacity in regard to the matters and things charged in the said bills of complaint otherwise than as an agent, officer, or stockholder of the said company.

IV. He denies the infringement charged in the said bills of complaint as to him, a separate defendant, and submits that as to him the said complainant is not entitled to the relief sought for in the said bills of complaint.

V. And this defendant denies all and all manner of unlawful combination and confederacy wherewith he is by the said bills charged, without this, that there is any other matter, cause or thing in the said complainant's said bills of complaint contained, material or necessary for him to make answer unto and not herein and hereby well and sufficiently answered, confessed, traversed and avoided, or denied, is true to the knowledge or belief of this defendant. All which matters and things he is ready and willing to aver, maintain and prove as this——

68 In the Circuit Court of the United States for the District of Minnesota.

WILLIAM DEERING
*vs.*
MCCORMICK HARVESTING MACHINE COMPANY. } Equity.

*The Answer of the McCormick Harvesting Machine Company to the Bill of Complaint Herein.*

This defendant now and at all times hereafter, saving and reserving unto itself all manner of benefits and advantages of exception that may be had to the errors, uncertainties, insufficiencies and imperfections in said bill of complaint, for answer thereunto, or unto such thereof as it is advised is material and necessary for it to make answer unto, answering says as follows, to wit:

First. It denies upon information and belief that John F. Steward and William F. Olin were severally the true, original or first inventors of any new or useful improvements in grain-binders as alleged in the bill of complaint herein; denies that the said alleged improvements were new or useful; denies that they had not been known or used before the several alleged inventions
69 thereof; denies that they had not been in public use and on sale for more than two years prior to the several alleged applications for patents thereon; and avers that each and all of the said alleged improvements had been in public use or on sale in this

country for more than two years prior to the several applications of said John F. Steward and William F. Olin for patents thereupon, and that they had been abandoned to the public.

Second. It admits that letters patent of the United States numbered 191,264, were issued on the 29th day of May, 1877, to Elijah H. Gammon and William Deering, the complainant herein, as assignees of said John F. Steward, that letters patent of the United States, numbered 223,812, were issued on the 27th day of January, 1880, to said William F. Olin; that letters patent of the United States numbered 266,913 were issued on the 31st day of October, 1882, to Elijah H. Gammon and William Deering, the complainant herein, as assignees of said John F. Steward, and that letters patent of the United States numbered 272,598 were issued on the 20th day of February, 1883, to said John F. Steward, but it denies that the grants of said several letters patent were in accordance with the then existing acts of Congress or in conformity with the law; denies that there was thereby secured to the said Elijah H. Gammon, William Deering, John F. Steward and William F. Olin, their heirs or assigns, any right or rights whatsoever; denies that the alleged improvements therein described and claimed involve patentable invention; and denies that the said Steward and Olin were severally the inventors thereof or of any substantial or material part thereof.

Fourth. It is not informed, save by the bill of complaint
70 herein, whether certain or any assignments under said letters patent were made, executed or recorded as alleged in said bill of complaint whereby all or any right, title and interest in and to said several letters patent, 191,264, 223,812, 266,913 and 272,598 and in and to all and singular the alleged exclusive rights and privileges secured thereby was transferred to and vested in said William Deering and it therefore denies the same; denies that complainant is the sole and exclusive owner of the said several letters patent and of all and singular the alleged exclusive rights and privileges secured thereby, and leaves complainant to make proof thereof.

Fifth. It denies that all or any of the said letters patent are in all respects good and valid at law; denies that said several alleged improvements are of any utility whatsoever; denies that the alleged exclusive rights and privileges secured thereby are of great value or of any value whatsover; denies that complainant is, or for several years last past has been engaged in manufacturing harvesting machinery in any other respect than as a stockholder in a corporation which is not party to this suit, and denies that complainant has manufactured or put upon grain-binders said several alleged improvements or applied them to practical use extensively or at all.

Sixth. It denies that it has infringed or is infringing said patents or either of them, or any part thereof; denies that it has made, used or sold, or caused to be made, used or sold machines containing or embodying the said inventions and improvements or any substantial or material part thereof; denies that it has made or realized any gain, profit or advantage therefrom, or has in any way violated the rights of complainant herein, and denies that complainant has been deprived of any royalties or has incurred any in-

jury, loss or damages by reason of any wrongful act of this defendant.

71 Seventh. It denies that said alleged improvements are capable of conjoint as well as separate use; denies that it has used or is using the said alleged inventions or any substantial or material part thereof separately or conjointly; and denies that it has been or is making grain-binders containing in one and the same machine the inventions and improvements alleged to be secured in and by each of said several letters patent, or any substantial or material part thereof.

Eighth. It avers that the said letters patent, Nos. 191,264 and 223,812 do not exhibit successful and practically operative machines, and are therefore void, and that the alleged improvements therein claimed are not, as there shown, of practical utility and have never been put into practical use, but have been abandoned as worthless.

Ninth. It says that said John F. Steward and William F. Olin severally were not the original or first inventors of the alleged improvements, or any material or substantial part thereof, described in said letters patent, Nos. 191,264, 223,812, 266,913 and 272,598; that the same had been shown and described in letters patent and printed publications and works, and had been in public use and on sale in this country prior to the supposed inventions and discoveries by said Steward and by said Olin, and that the same had been abandoned to the public.

Tenth. Further answering, it says upon information and belief, as to letters patent No. 191,264, issued to Elijah H. Gammon and William Deering, as assignees of John F. Steward, May 29, 1877, that they had expired before the commencement of this suit,

72 for the reason that a prior patent for the same invention was granted said Steward, in the Dominion of Canada, on the 21st day of February, 1877, No. 7122, for the term of five years, which patent expired long prior to the commencement of this suit, and prior to the manufacture, uses and sales complained of.

Eleventh. It says, upon information and belief, that said prior Canadian letters patent, No. 7122, were forfeited and expired by operation of law long prior to the expiration of their original term, and prior to the manufacture, uses and sales complained of, by reason of the open, notorious and public importation from the United States into Canada, for sale in said latter country, by complainant and those acting by his authority, with the knowledge and acquiescence of said Steward, and by others without objection from him, of machines embodying the alleged invention purporting to be patented therein, and by reason of failure of the patentee or his assigns to manufacture the said alleged invention in Canada within the period of two years from the date of said patent No 7122, wherefore said subsequent letters patent No. 191,264, of the United States, were also forfeited and expired by operation of law; it being provided by the existing patent act of Canada, to wit: 35th Victoria, chapter 26th, section 28, that such importation and failure to manu-

facture shall cause all rights and privileges granted under letters patent to cease and determine, and render said patent null and void.

Twelfth. It says upon information and belief, that said letters patent No. 191,264 are now and ever have been invalid for the reason that they were not when issued so limited as to expire at the same time with said foreign patent granted by the Dominion of Canada to said Steward for the same invention.

73 Thirteenth. It says as to letters patent No. 191,264 that complainant has no grounds for relief in equity for the reason that they had expired by operation of law long prior to the commencement of this suit.

Fourteenth. It says that said alleged improvements described and purporting to be embraced in letters patent No. 191,264, or every material and substantial part thereof, were, prior to the alleged invention thereof, by said John F. Steward, described and shown in the following letters patent of the United States, to wit:

No. 9930, granted to Watson & Renwick, Dec. 6, 1853, for an improvement in grain harvester and binder.

No. 29352, granted to Cornelius Bergen, July 31, 1860, for an improvement in grain-separators.

No. 40463, granted to S. A. Cumming, Nov. 3, 1863, for an improvement in reaping machines.

No. 55440, granted to Richard Hornsby, June 6, 1866, for an improvement in reaping machines.

No. 71660, granted to Ole O. Storle, Dec. 3, 1867, for an improvement in grain-binders.

No. 84105, granted to P. & D. Geiser, Nov. 17, 1868, for an improvement in threshing machines.

No. 85210, granted to Stephen D. Carpenter, Dec. 22, 1868, for an improvement in grain-binders.

No. 87263, granted to J. H. Jones, Feb. 23, 1860, for improvement in harvesters.

No. 91282, granted to Ole O. Storle, June 15, 1869, for an improvement in grain-binders.

No. 103,673, granted to Geo. H. Spaulding, May 31, 1870, for an improvement in grain-binders.

No. 130,852, granted to James F. Gordon, Aug. 27, 1872, for an improvement in harvesters.

74 No. 146,526, granted to John H. Gordon, Jan. 20, 1874, for an improvement in harvesters.

No. 149,233, granted to Sylvanus D. Locke, March 31, 1874, for an improvement in grain-binders.

No. 151,967, granted to James F. Gordon, June 16, 1874, for an improvement in grain-binders.

No. 155,781, granted to Pascal & Newel Whitney, Oct. 6, 1874, for an improvement in grain-binders.

No. 159,506, granted to Marquis L. Gorham, Feb. 9, 1875, for an improvement in grain-binders.

No. 163,831, granted to J. H. Whitney, May 25, 1875, for an improvement in harvester rakes.

No. 168,120, granted to J. H. Whitney, Sept. 28, 1875, for an improvement in grain-binders.

No. 169,936, granted to J. H. Whitney, Nov. 15, 1875, for an improvement in harvester rakes.

No. 181,664, granted to Thaddeus Fowler, Aug. 29, 1876, for an improvement in grain-binders.

No. 181,994, granted to William Lottridge, Sept. 5, 1876, for an improvement in grain-binders.

Fifteenth. It says that said alleged improvements described and purporting to be embraced in letters patent No. 191,264, or every material and substantial part thereof, were, prior to the alleged invention thereof by said Steward, and more than two years prior to his application for a patent therefor, known to and publicly used by John H. Gordon, of Rochester, New York, at and near Kalamazoo, Michigan, and elsewhere.

Sixteenth. Further answering, it says as to letters patent No. 223,812, issued to William F. Olin, January 27th, 1880, that the claims in the original application upon which said letters patent issued were required by the Commissioners of Patents to be
75 limited as a prerequisite to the grant of the patent, and that such limitation was accepted by said Olin, and incorporated in the claims of his application by amendment, and that by said limitation the claims have been so restricted that they cannot be construed to cover any device or combination heretofore or at any time manufactured by the defendant herein.

Seventeenth. It says as to said letters patent No. 223,812, that they are void, for that a prior patent, to wit, No. 211,862, was granted to the said William F. Olin on the 4th day of February, 1879, and accepted by him, which prior letters patent fully show and describe the alleged invention shown and described in the said letters patent No. 223,812, and made the subject of the claims thereof.

Eighteenth. It says that said alleged improvements described and purporting to be embraced in letters patent No. 223,812, or every material and substantial part thereof, were, prior to the alleged invention thereof by said Olin, described and shown in the following letters patent of the United States, to wit:

No. 9930, granted to Watson & Renwick, Dec. 6, 1873, for an improvement in harvester and binder.

No. 41080, granted to C. W. & W. W. Marsh, Jan. 5, 1864, for an improvement in raking device for harvesters.

No. 45642, granted to Jacob Seibel, Dec. 27, 1864, for an improvement in harvester-dropper.

No. 48363, granted to Robert D. Brown, June 27, 1865, for an improvement in binding attachment for harvesters.

No. 52175, granted to Israel Lancaster, Jan. 23, 1866, for an improvement in grain-binders.

76 No. 54672, granted to Joseph Barta, May 15, 1866, for an improvement in grain-binders.

No. 120,828, granted to Moses Ridout, Nov. 14, 1871, for an improvement in grain-binders.

No. 160,895, granted to Marquis L. Gorham, March 16, 1875, for an improvement in harvesters.

No. 165,316, granted to John H. Elward, July 6, 1875, for an improvement in harvesters.

No. 177,231, granted to John H. Elward, May 9, 1876, for an improvement in harvesters.

No. 188,125, granted to Geo. H. Green, March 6, 1877, for an improvement in grain-binders.

No. 192,150, granted to Edwin Chapman, June 19, 1877, for an improvement in grain-binders.

No. 192,151, granted to Edwin Chapman, June 19, 1877, for an improvement in grain-binders.

No. 193,112, granted to John H. Elward, July 17, 1877, for an improvement in harvesters.

No. 193,637, granted to H. H. Bridenthal, July 31, 1877, for an improvement in grain-binders.

No. 196,386, granted to Wm. J. Powell, Oct. 23, 1877, for an improvement in cotton-harvesters.

No. 89906, granted to William L. Williams, May 11, 1869, for an improvement in wood-splitting machine.

Nineteenth. It says that said alleged improvements described and purporting to be embraced in letters patent No. 223,812, or every material and substantial part thereof, were, prior to the alleged invention thereof by said Olin, and more than two years prior to his application for a patent therefor, known to and publicly used by John H. Elward, formerly of Saint Paul, Minnesota, but now of Stillwater, Minnesota, at Saint Paul, and elsewhere.

77 Twentieth. Further answering, it says as to letters patent No. 266,913, issued to Elijah H. Gammon and William Deering, October 31st, 1882, as assignees of said John F. Steward, that it is informed by the complainant, and understands it to be the fact, though not stated in the bill of complaint, that it is charged with infringing only one claim of the said letters patent, to wit, the twenty-first claim thereof.

Twenty-first. It says, on information and belief, that the application of the said John F. Steward, upon which letters patent No. 266,913 were granted, was pending in the United States Patent Office for more than four years; that this great delay was owing largely to the laches of said Steward, or his assignee, in prosecuting the said application; that said application was filed and long presented before the Patent Office without any claim to the combination now made the subject of the 21st claim of said patent; that during the pendency of the said application and before any amendment incorporating the said twenty-first claim was filed, and before any claim was made to the subject-matter thereof by said Steward, various patents, cited in the immediately succeeding section, showing combination sought to be included by the said twenty-first claim were passed upon and issued by the United States Patent Office; that during such pendency and before the incorporation of said twenty-first claim, and, as defendant believes, more than two years before any application by said Steward for a patent on the subject-

matter thereof, the devices now sought to be covered by said claim had gone largely into public use, and, among others, were manufactured, used and sold in their present form by this defendant; and that this defendant has reason to believe, and does
78 believe and so charges, that said twenty-first claim was wrongfully procured to be inserted by said Steward or his assignees with a view to covering these improvements in the art developed and put into use subsequent to the filing of his application, and after any right he might otherwise have had in respect thereto, was forfeited.

Twenty-second. It says that said alleged improvements described and purporting to be embraced in said letters patent No. 266,913, or every material or substantial part thereof were, prior to the alleged invention thereof by said Steward, described and shown in the following letters patent of the United States, and of the Kingdom of Great Britain, to wit:

*Letters Patent of the United States.*

No. 9930, granted to Watson & Renwick, Dec. 6, 1873, for an improvement in grain harvesters and binders.

No. 28738, granted to Albia B. Smith, June 19, 1860, for an improvement in raking and binding apparatus for harvesters.

No. 30343, granted to Edwin Paye, Oct. 9, 1860, for an improvement in power hammers.

No. 37408, granted to Theodore Palmer, February 13th, 1863, for an improvement in grain-binders.

No. 51599, granted to Sylvanus D. Locke, Dec. 19, 1865, for an improvement in grain-binders.

No. 53138, granted to Wm. F. Goodwin, March 13, 1866, for an improvement in grain-binders.

No. 75215, granted to A. S. Stone, March 3, 1868, for an improvement in grain-binders.

No. 81891, granted to Joseph B. Greenhut, Sept. 8, 1868, for an improvement in grain-binders.

79 No. 97531, granted to Sylvanus D. Locke, Dec. 7, 1869, for an improvement in grain-binders.

No. 97533, granted to Sylvanus D. Locke, Dec. 7, 1869, for an improvement in grain-binders.

No. 103,861, granted to Thaddeus Fowler, June 7, 1870, for an improvement in machines for binding grain.

No. 107,717, granted to B. C. Bole, Dec. 27, 1870, for an improvement in treadles.

No. 121,290, granted to Sylvanus D. Locke, Nov. 28, 1871, for an improvement in grain-binders.

No. 126,520, granted to Edwin Chapman, May 7, 1872, for an improvement in grain-binders.

No. 128,981, granted to A. Shedlock, July 16, 1872, for an improvement in cranks.

No. 142,611, granted to J. H. Carothers, Sept. 9, 1873, for an improvement in pitman.

No. 158,466, granted to Stephen D. Carpenter, Jan. 5, 1875, for an improvement in grain-binding harvesters.

No. 172,903, granted to R. Adams, Feb'y 1, 1876, for an improvement in elastic pitmans.

No. 175,785, granted to Chas. L. Travis, April 4, 1876, for an improvement in grain-binders.

No. 178,993, granted to John L. Buxton, June 20, 1876, for an improvement in grain-binders.

No. 186,056, granted to Samuel Miller, Jan. 9, 1877, for an improvement in grain-binders.

No. 188,125, granted to George F. Green, March 9, 1877, for an improvement in grain-binders.

No. 191,096, granted to Wm. R. Baker, May 22, 1877, for an improvement in grain-binders.

No. 191,926, granted to John E. Buxton, June 12, 1877, for an improvement in grain-binders.

80 No. 191,929, granted to John E. Buxton, June 12, 1877, for an improvement in grain-binders.

No. 192,150, granted to Edwin Chapman, June 19, 1877, for an improvement in grain-binders.

No. 200,544, granted to Moses A. Keller, Feb'y 19, 1878, for an improvement in grain-binders.

No. 205,067, granted to Lambert Erpelding, June 18, 1878, for an improvement in grain-binders.

No. 75051, granted to Elijah S. Pierce, March 3, 1868, for an improvement in connecting rod.

No. 81273, granted to Wilhelm Hoeft, Aug. 18, 1868, for an improvement in washing machines.

No. 101,496, granted to James Nolan, April 5, 1870, for an improvement in feeding apparatus.

No. 133,800, granted to Abram A. Rheutan, April 5, 1872, for an improvement in envelope machine.

No. 192,034, granted to S. D. Tucker, June 12, 1877, for an improvement in folding machine.

No. 197,547, granted to Wm. H. Field, Nov. 27, 1877, for an improvement in mail-plate feeder.

No. 221,922, granted to Moses A. Keller, Nov. 25, 1879, for an improvement in gleaning and grain-binding machines.

No. 256,188, granted to John F. Appleby, April 11, 1882, for an improvement in grain-binders.

No. 260,634, granted to John F. Appleby, July 4, 1882, for an improvement in grain-binders.

No. 261,072, granted to John F. Appleby, July 4, 1882, for an improvement in grain-binders.

No. 263,370, granted to Cyrenus Wheeler, Jr., Aug. 29, 1882, for an improvement in self-binding harvester.

No. 264,602, granted to John F. Appleby, Sept. 19, 1882, for an improvement in grain-binders.

81 *Letters Patent of the Kingdom of Great Britain.*

No. 3436 of 1866, to William Exall, granted and dated June 29, 1867.

No. 2629 of 1875, to Wm. McIntire Cranston, granted and dated Jan. 24, 1876.

No. 3585 of 1877, to Edwin Whiteworth, granted and dated March 23, 1876.

No. 4242 of 1877, to Thomas R. H. Fisken, granted and dated March 23, 1878.

No. 4745 of 1877, to McIville Thompson Neale, granted and dated June 13, 1878.

No. 4155 of 1878, to Wm. Woolnough and Christopher Kingsford, granted and dated April 18, 1879.

Twenty-third. It says that said alleged improvements described and purporting to be embraced in said letters patent No. 266,913, or every material or substantial part thereof, were, prior to the alleged invention thereof by said Steward, and more than two years prior to his application for a patent therefor, known to and publicly used by George F. Green, of Kalamazoo, Michigan, at and near said Kalamazoo, and elsewhere; known to and publicly used by G. A. Houston and W. P. Smith, of Beloit, Wisconsin, at and near said Beloit, and elsewhere; known to and publicly used by Abel Hoover and William Gamble, of Miamisburg, Ohio, at and near said Miamisburg, and elsewhere; known to and publicly used by John F. Appleby, of Minneapolis, Minnesota, at and near said Minneapolis and elsewhere.

Twenty-fourth. Further answering, it says, as to letters patent No. 272,598, granted to John F. Steward, February 20, 1883, that

82 said alleged improvements described and purporting to be embraced in said letters patent, or every material and substantial part thereof, were, prior to the alleged invention thereof by said Steward, described and shown in the following letters patent of the United States and of the Kingdom of Great Britain, to wit:

*Letters Patent of the United States.*

No. 9930, granted to Watson & Renwick, Dec. 6, 1853, for an improvement in grain harvesters and binders.

No. 48363, granted to Rob't D. Brown, June 27, 1865, for an improvement in binding attachment to harvesters.

No. 52175, granted to Israel Lancaster, Jan. 23, 1866, for an improvement in grain-binders.

No. 120,828, granted to Moses T. Ridout, Nov. 14, 1871, for an improvement in grain-binders.

No. 139,986, granted to J. Werner, Jr., June 17, 1873, for an improvement in harvesters.

No. 140,738, granted to G. H. Spalding, July 8, 1873, for an improvement in harvesters.

No. 165,316, granted to John H. Elward, July 6, 1875, for an improvement in harvesters.

No. 177,231, granted to John H. Elward, May 9, 1876, for an improvement in grain-binders.

No. 7491, granted to Israel Lancaster, Feb. 6, 1877, for an improvement in grain-binders (reissue).

No. 188,125, granted to George F. Green, March 6, 1877, for an improvement in grain-binders.

No. 192,150, granted to Edwin Chapman, June 19, 1877, for an improvement in grain-binders.

No. 192,151, granted to Edwin Chapman, June 19, 1877, for an improvement in grain-binders.

83 No. 193,112, granted to John H. Elward, July 17, 1877, for an improvement in harvesters.

No. 193,637, granted to H. H. Bridenthal, Jr., July 31, 1877, for an improvement in grain-binders.

No. 210,520, granted to James F. Gordon, Dec. 30, 1878, for an improvement in grain-binders.

No. 211,862, granted to Wm. F. Olin, Feb. 4, 1879, for an improvement in harvesting machines.

No. 223,812, granted to Wm. F. Olin, Jan. 27, 1887, for an improvement in harvesters.

No. 226,865, granted to C. W. Levalley, April 27, 1880, for an improvement in grain-binders.

No. 9179, granted to John H. Elward, April 27, 1880, for an improvement in harvesters (reissue).

No. 229,396, granted to Albert Goodyear, June 29, 1880, for an improvement in grain-binders.

No. 236,202, granted to J. H. Borton, Jan. 4, 1881, for an improvement in grain-binders.

No. 236,577, granted to George F. Green, Jan. 11, 1881, for an improvement in grain-binders.

No. 237,135, granted to James R. Servance, Feb. 1, 1881, for an improvement in grain-binders.

No. 238,750, granted to Chas. S. Travis, March 8, 1881, for an improvement in grain-binding machines.

No. 241,451, granted to Chas. S. Travis, May 10, 1881, for an improvement in grain-binding machines.

No. 261,007, granted to F. T. and F. A. Lomont, July 11, 1882, for an improvement in grain-binders.

No. 262,026, granted to George Esterly, Aug. 1, 1882, for an improvement in grain-binding harvesters.

No. 263,160, granted to Edwin S. Frost, Aug. 22, 1882, for an improvement in grain-binding attachment for reapers.

84 No. 248,401, granted to John E. Buxton, Oct. 18, 1881, for an improvement in grain-binders.

*Letters Patent of the Kingdom of Great Britain.*

No. 5088 of 1880, to William G. Mainwaring, granted and dated June 7, 1881.

No. 2275 of 1881, to Adam C. Bamlett, granted and dated Nov. 24, 1881.

No. 4029, to James Howard and Edward T. Bousfield, granted and dated March 22, 1882.

Twenty-fifth. It says that said alleged improvements described and purporting to be embraced in letters patent No. 272,598, or every material and substantial part thereof, were, prior to the alleged invention thereof by said Steward, and more than two years prior to his application for a patent therefor, known to and publicly used in the United States by Gottleib Heller, of Dillon, Dickinson county, Kansas, at and near said Dillon and elsewhere; known to and publicly used by John E. Buxton, of Owatonna, Minn., at and near said Owatonna, and elsewhere; known to and publicly used by George Esterly, of White Water, Wisconsin, at and near said White Water, and elsewhere; known to and publicly used by Joseph P. Bullock, of Beloit, Wisconsin, at and near said Beloit, and elsewhere; known to and publicly used by John F. Appleby, formerly of Beloit, Wisconsin, but now of Minneapolis, Minnesota, at and near said Beloit, and elsewhere; known to and publicly used by this defendant at and near Chicago, Illinois, and elsewhere.

Twenty-sixth. It says that machines in all material respects similar to those charged in the bill of complaint to be an in-
85 fringement of complainant's said letters patent, have been for many years publicly, notoriously and extensively manufactured and sold by it and by other manufacturers, at said Chicago and elsewhere in the United States, with the full knowledge of complainant and of his alleged predecessors in title in and under said letters patent, without any notice or claim of infringement under said letters patent, or either of them, this defendant and said manufacturers claiming and asserting the right so to do under letters patent owned by them, and under which they were respectively licensed, believing themselves to have said right, and having neither knowledge or intimation of adverse claim under the letters patent set forth in said bill; that defendant's trade in said machines has been thus in good faith built up and developed, at large outlay of labor and expense, with the knowledge and apparent acquiescence of complainant; that complainant has been guilty of laches in delaying to make, assert and enforce the claims now made against defendant's said machines, whereby defendant would be greatly wronged and injured if said patents should now be construed and upheld as covering defendant's said machines; that if complainant were otherwise entitled to have said patents so construed and upheld, such right, and particularly any right to relief in equity in respect thereto, would be abandoned and forfeited by said laches, and complainant is thereby estopped from asserting claim thereto, and barred from relief in this court.

Twenty-seventh. It denies that complainant is without full, adequate and complete relief in a court of law; and denies that he is entitled to relief in a court of equity, or that this cause is properly cognizable therein.

Twenty-eighth. And, further answering, defendant says that
86 the complainant is not entitled to the relief prayed for in this bill of complaint, without this that there is any other

matter, cause or thing in the said bill of complaint contained, material or necessary for this defendant to make answer unto, and not hereinbefore sufficiently answered, confessed and avoided, traversed or denied, is true, all of which matter and things defendant is ready to aver, maintain and prove as this honorable court may direct, and prays to be hence dismissed with its costs in this behalf most wrongfully sustained.

McCORMICK HARVESTING MACHINE COMPANY,
Per CYRUS H. McCORMICK, JR., *President.*

PARKINSON & PARKINSON,
*Solicitors and Counsel for Defendant.*

Before the U. S. Circuit Court, District of Minnesota.

WILLIAM DEERING
*vs.*
McCORMICK HARVESTING MACHINE COMPANY. } Equity.

Now comes The McCormick Harvesting Machine Company, defendant herein, and by leave of court first had and obtained, amends its answer to the bill of complaint as follows, to wit:

By erasing the words "Stillwater, Minnesota," in the last two lines of the nineteenth clause of answer, and inserting in lieu thereof the words "White Water, Wisconsin."

Also by inserting at the end of the 23rd clause of answer
87 the following, to wit: "known to and publicly used and sold by Parker & Stone, of Beloit, Wisconsin, being Charles E. Parker and Gustavus Stone, of said town, at and near said Beloit, and elsewhere, which use and sale is known, among others, to F. E. Adams, of said Beloit."

Also by inserting after "elsewhere" in the 7th line of 16th page, (25th clause of answer), the words: "known to and publicly used by John H. Elward, formerly of St. Paul, Minnesota, but now of White Water, Wisconsin, at and near said St. Paul and elsewhere."

PARKINSON & PARKINSON,
*Solicitors for Defendant.*

We consent to the entering of above amendment.

BANNING & BANNING,
*Solicitors for Complainant.*

88 And afterwards, to wit, on the 28th day of October, A. D. 1885, came the complainant, by his solicitors, and filed in the clerk's office of said court his replication in the words following, to wit:

89 The United States Circuit Court in and for the District of Minnesota.

WILLIAM DEERING
*vs.*
WINONA HARVESTER WORKS *et al.* } In Equity.

The replication of William Deering, complainant, to the answer of Winona Harvester Works, Charles L. Bonner, John J. Randall, Casper F. Search, and Charles H. Porter, defendant-.

Th- repliant, saving and reserving unto himself now and at all times hereafter all and all manner of advantage of exception to the manifold insufficiencies of the said answer, for replication thereunto saith that he will aver, maintain, and prove his said bill of complaint to be true, certain, and sufficient in the law to be answered unto, and that each of the said answers of the said defendants is uncertain, untrue, and insufficient to be replied unto by this repliant; without this, that any other matter or thing whatsoever in the said answer contained material or effectual in the law to be replied unto and not herein and hereby well & sufficiently replied unto, confessed and avoided, traversed or denied, is true; all which matters and things this repliant is and will be ready to aver and prove as this honorable court shall direct, and humbly prays as in and by his said bill he has already prayed.

BANNING & BANNING,
*Solicitor- for Complainant.*

—— ——, *Of Counsel.*

[Endorsed:] Equity. No. —. United States circuit court, district of Minnesota. William Deering *vs.* Winona Harvester Works *et al.* Replication.
(Endorsed:) Filed this 28th day of Oct., 1885. Oscar B. Hillis, clerk.

90 And afterwards, to wit, on the 13th day of May, A. D. 1889, the following proceeding of court was had in the words as follows, to wit:

91 United States Circuit Court for the District of Minnesota.

Term Minutes, December Term, A. D. 1888, May 13th, 1889.

T. M. "H," page 205.

WILLIAM DEERING
*vs.*
THE WINONA HARVESTING WORKS *et al.* }

The above-entitled cause regularly coming on for hearing upon the pleadings, final proofs, and arguments of counsel, complainant appears by his solicitors, Thomas A. Banning and B. F. Thurston, and the defendants by their solicitor, Robert H. Parkinson.

Thereupon said cause is argued upon behalf of complainant by Thomas A. Banning.

And the hearing of the same not being concluded at the hour of adjournment, it is ordered that further proceedings herein be, and they are hereby, postponed until tomorrow morning at 10 o'clock.

92 And afterwards, to wit, on the 14th day of May, A. D. 1889, the following proceeding of court was had in the words following, to wit:

93 United States Circuit Court for the District of Minnesota.

Term Minutes, December Term, A. D. 1888, May 14th, 1889.

T. M. "H," page 206.

WILLIAM DEERING
*vs.*
THE WINONA HARVESTING WORKS *et al.*

This cause again coming on to be further heard upon the pleadings, proofs, and final arguments of counsel, the same is further argued on behalf of complainant by Thomas A. Banning, Esq., and the hearing not being concluded at the hour of adjournment it is ordered that further proceedings herein be, and they are hereby, postponed until tomorrow morning at 10 o'clock.

94 And afterwards, to wit, on the 15th day of May, A. D. 1889, the following proceeding of court was had in the words following, to wit:

95 United States Circuit Court for the District of Minnesota.

Term Minutes, December Term, A. D. 1888, May 15th, 1889.

T. M. "H," page 207.

WILLIAM DEERING
*vs.*
THE WINONA HERVESTING WORKS *et al.*

This cause again coming on to be further heard upon the pleadings, final proofs, and arguments of counsel, the same is argued on behalf of defendant- by Robert H. Parkinson, Esq.; and the hearing not being concluded at the hour of adjournment, it is ordered that further proceedings herein be, and they are hereby, postponed until tomorrow morning at 10 o'clock.

96 And afterwards, to wit, on the 16th day of May, A. D. 1889, the following proceeding of court was had in the following words, to wit:

97 United States Circuit Court for the District of Minnesota.

Term Minutes, December Term, A. D. 1888, May 16th, 1889.

T. M. "H," page 208.

WILLIAM DEERING
*vs.*
THE WINONA HARVESTING WORKS *et al.*

This cause again coming on to be heard upon the pleadings, final proofs, and arguments of counsel, the same is further argued on behalf of defendant- by Robert H. Parkinson, and on behalf of complainant by B. F. Thurston.

And the hearing not being concluded at the hour of adjournment, it is ordered that further proceedings herein be, and they are hereby, postponed until tomorrow morning at 10 o'clock.

98 And afterwards, to wit, on the 17th day of May, A. D. 1889, the following proceeding of court was had in the words as follows, to wit:

99–101 United States Circuit Court for the District of Minnesota.

Term Minutes, December Term, 1888, May 17th, 1889.

T. M. "H," page 209.

WILLIAM DEERING
*vs.*
THE WINONA HARVESTING WORKS *et al.*

This cause again coming on to be further heard upon the pleadings, final proofs, and arguments of counsel, the same is further argued on behalf of complainant by B. F. Thurston, duly submitted, and by the court taken under advisement.

And on the 30th day of November, A. D. 1889, the court filed its written opinion in words and figures as follows, to wit:

102 DEERING
*v.*
McCORMICK HARVESTING MACH. CO.

SAME
*v.*
WINONA HARVESTER WORKS *et al.*

(Two cases.)

(Circuit Court, D. Minnesota, November 30, 1889.)

1. Patents for inventions—Harvesters—Infringement.—The fifth claim of letters patent No. 191,264, dated May 29, 1877, for improved harvester, being a combination of toothed arms, a slotted receiving platform, and fixed springs, with the char-

acteristics described in the patent, and co-operating for compacting the gavels, is not infringed by a harvester with a compressor in alingment with the packers, and below them, near the tail of a stationary receiving platform, working as a resistant to compact the gavel, the platform having one wide slot, through which the teeth move the wisps against overhanging rods.

2. Same.—Letters patent No. 223,812, for improvement in harvester machines, so that the grain may be freely delivered by means of a swinging side elevator, conveying the grain, properly straightened, to the receiving table, so that it can be bound at the middle, are not infringed by a harvester with a swinging platform, and an elevator which drops the grain on an inclined board, with slots through which packing arms operate to compact the grain, with an endless apron, which is not connected with the harvester elevator.
3. Same—Prior state of the art.—The twenty-first claim of letters patent No. 266,913, relating to mechanism for compressing the bundle of grain just before tying, in connection with a spring link for relieving the binding mill from strain, and obviating breakage when the grain is no longer compressible, is not infringed, in view of the former state of the art, by a device furnishing an elastic yielding of the compressor, which is not of the peculiar construction set forth in the claim.
4. Same.—In view of the prior state of the art, claims Nos. 3, 4, 9, and 10, under letters patent No. 272,598, dated February 20, 1883, whereby an automatic grain-binder regulates the position of the band in the gavel so as to place the gavel in its proper position, relative to the length of the grain, without the attention of the operator, must be limited to the peculiar construction of mechanism as set forth in the specifications by which this result is obtained.
5. Same—Anticipation.—The combination of the swinging butt-adjuster, arms, and a board pivoted to the adjuster, as set forth in claims 20 and 21 of letters — 272,598, is anticipated by the "Heller butt-adjuster," used on harvesters in 1878 or 1880.
6. Same.—Letters patent No. 251,147, dated December 20, 1881, describing a mechanism for raising, lowering, and fastening the grain platform of a harvester, is anticipated by a patent issued to one Bacon in 1838 for lowering, fastening, and raising windows.

In equity. Bill for infringement of patents.

Banning & Banning and B. F. Thurston, for complainant.

Parkinson & Parkinson, for McCormick Manufacturing Company.

Dyrenforth & Dyrenforth, for the Winona Harvester Works and others.

NELSON, *J.*:

Three suits are brought by William Deering—two against the Winona Harvester Works and others, which are consolidated, and the other one against the McCormick Harvesting Machine Company—for the infringement of certain letters patent for improvement in harvesters, or harvester binders. They are heard together. In controversy, there are involved with the McCormick Company letters patent No. 191,264, issued May 29, 1877, to John F. Steward; No. 223,812, issued January 27, 1880, to William F. Olin; No. 266,913, issued October 31, 1882; also No. 272,598, issued February 20, 1883, to John F. Steward. 103

The same patents are involved in the suit against the Winona Company, and, in addition, letters patent No. 278,639, issued May 29, 1883, and letters patent No. 301,190, issued July 1, 1884, also letters patent No. 251,147, issued December 20, 1881, to John W. Webster. The first two patents involved in the Winona Company's suit, and not in the McCormick case, relate to the "knotter" by which the cord is held around the bundle of grain; and counsel consent that a decree may be entered against that company for an infringement of these patents, so that they are eliminated from this controversy. The complainant and the McCormick Company are extensive manufacturers and competitors throughout the grain-producing regions of the world, and by their efforts have stimulated the inventive genius of that class of persons interested in the improvement and development of practical machinery for cutting and binding grain. The Winona Company was a new enterprise, inaugurated under the superintendence and management of men formerly in the employ of the complainant, and manufactured a machine in its general features and operation like those introduced and sold by the complainant, and also by the McCormick Company.

Steward patent, No. 191,264, dated May 29, 1877.—Defenses: No infringement, and want of novelty and patentability, and estoppel. It is remarkable that no machines are in use, at the present time, manufactured precisely according to the specifications, claims, and design of this patent; and, although the complainant is the owner, he does not construct the machine sold by him like the drawing of the patent. The charge is made that both defendants infringe the fifth claim of this patent. This claim is as follows:

"The combination of the toothed arms *p*, slotted receiving platform H, and the fixed spring arms *u v*, for compacting the gavels, substantially as specified."

It is necessary to a proper understanding of this claim and the devices involved to look at the mechanism of the machine described, and for which the patent was granted, and its purposes in the light of the existing state of the art. This patent is denominated "improvement in grain-binders." The patentee, in his description, says:

"I have invented new and useful improvements in harvesters. The object of this invention is to improve the construction of grain

harvesting and binding machines; and its nature consists * * * in providing a device for compacting the grain ready for binding; * * * in providing devices for retaining the cut grain in proper position at all times while being forced into the binding wire; and in the several parts, and combination of parts, hereinafter set forth and claimed as new."

The claim, in connection with the drawings and model exhibited, calls for a slotted receiving platform, toothed arms arranged to pass through it and protrude, so as to engage and force forward the flowing grain, and spring arms fixed directly opposite the slots in the platform, operating as resistants to the arms moving forward through the slots, and thus the packers or arms, with the springs directly opposite, acting as resistants, compact the gavel while it is
104 being formed, and finally press it through and under the springs, to be operated upon by the needle arm, and bound. When Steward applied for this patent he was familiar with the operation of a binder, then in the market, on the Gordon or McElroy machine, and alleges that the combination of this fifth claim in the patent was the result of his personal experience in the field, and that the necessity of such improvement was then demonstrated. In order to make a machine effective as a binder, the wisps of grain must be formed into a gavel of proper size to make the bundle This could only be accomplished by some device which would press the wisps of grain together, and finally hold them, until the binding mechanism tied the bundle. In 1868, Carpenter received letters patent for "improvement in grain-binders," and his invention related to improvements for conveying the grain from the platform to the binding mechanism, and there compressing it into a bundle by means of compressor rods and the revolving rake. The compressor rods and the teeth of the revolving rake perform, to some extent, the same duties as the teeth, *p*, and the spring rods in the Steward patent. The rods are pivoted at one end only, and they operate as resistants in an opposite direction to the teeth on the revolving rake. They are held down by a spring pawl, which tends to make them rigid, so as to hold the bundle being formed by the wisps brought up by the rake-teeth. The rods spring back when released by the pawl at the proper time, and the bundle is carried over the shaft which carries the binder arm.

So the Storle patent, 1869, has spring rods under which, on the platform, the wisps are raked, and these spring rods tend in a slight degree to compact the gavel as it forms, and keep the grain down. In the Whitney machine, 1875, overhanging curved rods, called "E," drop down, and, as the wisps are brought along by the rake-teeth, the rods operate as resistants to compact the gavel. The Gorham machine was patented about this time, and the Gordon one year earlier, called "Gordon-McElroy" by counsel. The latter had overhanging spring wires fastened to a rock-shaft, and their function was to compress the gavel and hold it until a bundle was ready to be bound. As in the Storle and the Whitney, the bundle was formed by the revolving rake-teeth, called "arms" or "packers," and the rods acting upon the grain on the platform.

In the Gordon machine the spring rods were not placed directly opposite the advancing arms, and there was a difficulty in the practical operation of the machine in the field; and, as I understand the witness, this difficulty was due to the form of the overhanging rods, and the fact that they were not independent resistants. Steward then, in his patent, provided a device for compacting the grain for binding. He changed the shape of the Gordon spring rods, and fastened them to a cross-bar, not a rock-shaft, so each would hang directly opposite to a slot in the platform, through which a tooth upon the revolving rake, or, as described in the patent, tooth of the sliding bar, operated. These rods had independent springs and operated as resistants independent of each other. He made a receiving platform, H, tilted by a crank shaft, and its function is particularly described in the specifications of the patent. It is de-
105 scribed as slotted, and the purposes for which this platform is introduced could not be accomplished unless it was slotted, and was capable of being tilted; so then, whenever the receiving platform, H, is spoken of, it must be understood that reference is made to a receiving platform, described in the patent as slotted, and firmly attached to a shaft or journal bar, connected with a crank and other devices, so that the platform, H, shall be tilting, and can be raised and returned to its proper position, as appears in the drawings accompanying the patent. The specification requires the receiving platform, H, to be constructed in this manner; and when the patentee introduces in a combination claim the platform, H, whether it be designated as a slotted platform, or a tilted platform, reference is made to the platform particularly described in the patent as an element of the combination. My construction of the fifth claim, therefore, is that it is limited to a combination of the toothed arms, receiving platform, slotted and tilting, and the fixed springs, each having the characteristics designated in the patent, and co-operating for compacting the gavels in the peculiar manner described in the patent; and the claim is not infringed, except by the combination of the same elements possessing the essential characteristics of those designated in the claim, and co-operating in the same way, for the same purpose. The defendants use no such combination. They have a compressor in alignment with the packers, and below them, near the tail of the receiving platform, and working as a resistant to compact and press the gavel. The grain in their machine passes from the elevator over and onto a receiving platform, with one wide slot, through which the packers or teeth move forward the wisps against and under two wires or rods overhanging, and coming down to that part of the platform, which drops and permits the bundle, when tied, to fall to the ground. The receiving platform is not tilting, but stationary. The rods do not hang down, and operate as compactors and resistants, opposite the slot through which the teeth advance in alignment with them, but are located at each side of it, and continue to bear upon the gavel, and prevent the straws of grain from slipping down, while the gavel is compacted or pressed between the teeth and the compressor. This is not the combination of the fifth claim, in the Steward patent, of

elements therein described, co-operating for the purposes designated; and the defendants do not infringe such claim, as charged. It is unnecessary to consider the other defenses.

Olin patent, No. 223,812.—Defenses: No infringement, want of novelty and patentability, and equitable estoppel. The defendant The Winona Company is charged with the infringement of all the six claims of this patent, and the defendant McCormick Company is charged with the infringement of all the claims except the fourth. The patent issued to Olin for "improvements in harvesting machines," and the nature of the invention, is stated as follows:

"In that class of harvesting machines where the grain is received upon a carrier platform, and elevated over the drive-wheel
106 by an elevator, and delivered to the binders, or an automatic binder, it is desirable that there shall be no stoppage in the flow of the grain in its passage to its place of delivery; that the butts of the grain shall be carried up parallel, or nearly so, with the heads of the grain, so as to deliver the grain in proper shape for binding purposes; and that the grain shall be delivered to the receiving table so that it can be bound at or near the middle. The object of this invention is to provide devices for attaining all these results, and it consists in interposing a roller between the lower end of the elevator and the inner end of the grain-carrier, to facilitate elevating the grain, and prevent clogging at that point, and prevent the grain from being carried down, or falling through between the elevator and carrier; in providing a belt or chain (called 'Q' in the patent) at the grain side of the machine for elevating the butts of the grain, supported on a swinging bar, so that it can be adjusted according to the length of grain being elevated, to deliver the grain so that it can be bound at the middle; in devices for operating and adjusting the elevator for the butts; in the peculiar construction of the cover; in arranging and operating the belt for the butts so that it prevents any clogging by short grain at the heel of the sickle; in arranging the device for elevating the butts so that it will bear against the butts of the grain, and crowd or move the grain back on the elevator towards the center, for the purpose of straightening the grain in its passage up the elevator, and delivering it so that it can be clasped or bound near the middle, to facilitate the ease of binding."

The drawings and model exhibited show and describe two rollers between the grain-carrier, or receiving platform, of a harvester, and an elevator which carries the grain over the drive-wheel, and a supplemental swinging side elevator or belt for elevating the butts, arranged so that it will bear against the butts, and crowd the grain back on the main elevator towards the center, and at the same time straighten the grain as it passes up, and delivering it so that it can be clasped and bound near the middle. The peculiar means of adjustment of the swinging elevator, and the mode of combining it with the harvester elevator, and the devices and mechanism used, are set forth at length. The claims are:

(1) "In combination with a harvester elevator, a swinging elevator pivoted at its lower end, and suitable devices for shifting its

upper end, whereby the swinging elevator forms a means for elevating the butts of the grain, and delivering grain of different lengths at the same point, substantially as specified." (2) "The adjustable elevator or belt, Q, having its pulleys or wheels arranged with their faces parallel with the upper surface of the main elevator, in combination with such main elevator, for carrying the butts up even with the heads, substantially as specified." (3) "The adjustable elevator or belt, Q, having its lower end, *c*, advanced in front of the line of grain travel, and arranged as described in relation to the main elevator, substantially as and for the purposes set forth." (4) "The pivoted frame or bar, *e*, supporting the elevator, Q, in combination with the sliding bar, *l*, rod, *n*, and lever, *o*, for adjusting the upper end of the belt, substantially as and for the purpose specified." (5) "The shaft, W, wheel, *h*, and frame, *i*, in combination with the gear wheel, *g*, and pulley wheel, *d*, for driving the elevator and keeping the gear wheels, *g*, *h*, in gear, substantially as specified." (6) "The elevator or belt, Q, in combination with the inclined board, R, and main elevator, substantially as and for the purpose set forth."

In the operation of harvesters, it was found that the straws which have been cut do not fall so as to lie evenly upon the moving
107 receiving platform. Some of them, particularly in short grain, assume an angular position; the heads of grain, when reaching the elevator, being in advance of the butts, so that, when carried up, the swath of grain is not presented to be bound at or near the middle. The straws in the swath move along up the elevator in the angular position assumed when they reached it. In 1875, to overcome this difficulty, Elward was granted a patent, in which he placed a short endless apron, set at the inner edge of the receiving platform, with its rear end nearest the elevator, obliquely to the line of cut, so as to engage the passing butts of grain, and move them backward prior to delivery to the elevator. He says this apron may be operated either by the friction of the passing butts, or it may be given a positive movement. Green, also, in 1877, obtained a patent for improvement in grain-binders, and in it he has a grain guide, "which is pivoted at the lower front corner of the elevator frame, on the grain side thereof, and which is provided at its upper end with a handle convenient to the driver sitting in his seat." The object of this guide is to move the butts of straw backward, so that the elevator will deposit the short grain into a receiver at its upper end, to be delivered to the compressing devices in proper position for being bound at or near the middle of its length. He claimed (No. 19) "an adjustable grain guide, T, combined with a grain-elevator in a harvester, substantially as described." As early as 1853, Watson and Renwick had a grain-binder patent, in which the grain was elevated to the binding apparatus "by means of a series of shifting endless bands, which, without stopping the machine, could be adjusted to present the grain to the binder in such position that the band will be passed around the middle of the sheaf, whether it be long or short." So, Marsh, in 1864, had alongside of the elevator a traveling inde-

pendent belt, with teeth, to carry up the butts of grain, and prevent them from lagging, and this belt moved faster than the elevator; and the belt is claimed in combination with the elevator and the traveling platform, upon which the grain, when cut, falls. All these devices, in the several patents mentioned, were placed on the side of the machine, where the grain was first taken from the receiving platform and elevated. Olin followed with his devices for elevating the grain so that it could be bound at or near the middle, and they were all on the side of the upwardly inclined moving canvas or elevator, which carries the grain from the receiving platform. The supplemental butt elevator in his patent is pivoted at its lower end, and acts upon the butts as the grain ascends. It facilitates the ease of binding properly near the middle, operating in combination with the main elevator, by straightening the grain in its ascent. The specifications and claims refer to those parts of a harvester concerned in elevating the grain from the platform, which receives it when cut, to the point where it is discharged and falls upon the binder platform; and the supplemental swinging butt elevator, Q, is described in the patent, so located that its teeth will engage with the butts of grain on a roller called "I," interposed between the foot of the main elevator and the end of the moving receiving platform, and carry them up, as well as force them backward.

108 The defendant's harvester has a receiving platform and an elevator, which drops the grain brought up onto an inclined board or binding deck, having slots through which packing arms project, and operate to compact the grain while the gavel is forming; and at the upper end of this deck or descending table is pivoted an endless apron, arranged so that its face side engages the butts, which facilitates the descent of the grain at the butt ends, and adjusts it lengthwise in proper shape for binding. This endless apron has a downward movement, and operates on the grain after it is delivered from the elevator, and adjusts it between the point of discharge from the elevator and the point at which it is subjected to the binding mechanism; but it does not operate, in combination with a harvester elevator, to carry the grain up as it passes from the platform upon which the cut grain falls. It is urged that there is no difference in the function and operation of the supplemental swinging elevator of Olin and defendant's endless apron; and the complainant's expert, Bates, says, in considering the first claim:

"* * * As shown and described in the patent, this belt, Q, (the Olin swinging-belt elevator,) is arranged with one end low down near the carrier platform, H, (the platform upon which the cut grain falls,) and the other end up near the highest point of travel of the grain; but it is obvious that these positions might be changed, and the device still operate in exactly the same way to push the grain back, and to convey the butts forward. For example, the receiving end of the belt, Q, might be further along on the path of the grain, even at the highest point on its path, or beyond it, and the delivery end also further along, even at the point, P, (a receiving table beyond the upwardly inclined canvas or elevator,)

or near it. * * * I therefore understand the essentials of this device to be that it shall be combined with the devices which elevate or convey the grain from the carrier platform to the binder; that it shall be pivoted at its receiving end, so that its delivery end may swing back and forth to accommodate grain of diffent lengths, and that its delivery end shall be provided with devices by which it may be moved back and forth for that purpose; and that it is immaterial at just what point in the path of the grain said swinging belt or conveyor, Q, is located. * * * I am also aware that in the claims the device is called an 'elevator;' and this is correct, but perhaps slightly misleading, as, whatever its position in a machine of the class illustrated in the patent, it assists in elevating the grain from the point, H, to the point, P, even though it were so located that it acted on the grain only on the downward portion of its path."

Renwick, defendant's expert, says, in considering the Olin patent, that it is limited strictly to an arrangement in which the pivoted end of the swinging elevator shall be literally and absolutely the lower end, and in which the swinging elevator operates upon the grain while it is being elevated from the platform upon which it is deposited by the cutters. I think Renwick has construed the patent correctly, and the complainant's expert, Bates, has overlooked, or not taken into account, the statements of the patentee, when he says:

"The elevator, Q, need not extend the entire length of the elevator, but may stop some distance below the upper elevator roller."

And again, when he says:

109 "In order to elevate the butts even with the heads, the belt or elevator, Q, is so arranged that the teeth, *b*, will engage with the butts of the grain on the roller, I, and carry them up while the heads are being carried up by the elevator belts, M. The lower pulley, *c*, is to be so arranged that it will permit the teeth, *b*, on the elevator, Q, to clear the end of the roller and engage the butts, and this pulley, *c*, is located as close to the main frame as is possible and permit the operation of the butt elevator; which location of the pulley brings the butt elevator in position to enable it to catch any short grain, which short grain is liable to fall down and be caught by the heel of the sickle, and clog the sickle. By locating the lower pulley, *c*, of the belt, Q, at the proper distance above the main frame, A, the teeth, *b*, on the elevator will come in contact with such short grain, and force it forward onto the carrier platform; thus keeping the heel of the sickle clear at this point."

There is no infringement of the claims by either defendant.

Steward compressor patent, No. 266,913.—Infringement by both defendants of twenty-first claim alleged.—Defenses: "Want of novelty and patentability;" "prior use, before claim inserted, for more than two years;" "no infringement." The twenty-first claim is as follows:

"The combination of the vibrating arm, $G^2$, the shaft, $F^2$, by which it is supported and moved, provided with a crank, $E^2$, a

moved part of the machine, and the connecting link, provided with a spring so that its length may elastically yield, whereby said vibrating arm will oppose the needle, and coact therewith as a compressor, and move away to permit the escape of the bundle, substantially as described."

This combination relates to the mechanism for compressing the bundle, and squeezing it to the requisite smallness, just before tying. The object of securing the arm, $G^2$, to the shaft, $F^2$, at the location described, in relation to the needle arm, V, which forms a part of the combination, is to allow the vibrating arm, $G^2$, to coact with this arm as a compressor, and relieve the binding wire from strain. The defendants' expert in his testimony describes the operation of the compressor arm, $G^2$, and the needle arm, V, and speaks of the spring link connecting the rock-shaft, $F^2$, with shaft moving the needle arm, V, as being placed there to obviate breakage of the needle or arm, or stopping the machinery, which would occur, when the grain was no longer compressible, without the spring-link connection, so as to permit compressing the spring in the link. I think he is correct, for in the specification the patentee says:

"This spring is strong enough to operate the crank, * * * and yet allow the rod * * * to slide through the head or socket, when the arm, $G^2$, has completed the compression of the bundle, so that no injury can result if the crank * * * continues its movement after the arm, $G^2$, has compressed the bundle."

The spring link directly connects the two shafts actuating the compressor and the needle arm and allows the rod to yield, so that the movement of the compressor, $G^2$, may be such as to adapt it to bundles of various sizes; but the patentee states that it is strong enough to obviate breakage, and, when the expert states that the purpose is to avoid accident, it is true, and the only criticism of the statement made is that the device incidentally avoids breakage, while its purpose is to produce elastic compression.

Yielding compression is obtained by the mechanism adopted, and undoubtedly the peculiar construction of the link spring, and its location, avoids accident; so that it may fairly be said that, if the main purpose is elastic or yielding compression, it can only be accomplished by the use of a device between the arms to prevent breakage also. But elastic yielding of the compressor arm is found in many grain-binders before Steward's patent; most of them cited by defendants, or put in evidence. See particularly the Baker patent, No. 191,096, which even Steward admits in his letter to Messrs. West & Bond of March 30, 1878, came close to him. All are different in construction, and the movement of the compressor is such as to adapt it to bundles of various sizes. The spring connection is used in all; not directly between the two shafts actuating the arms, but indirectly for accomplishing like results. Steward attempted on July 15, 1882, to broadly claim the use of a spring link for elastic compression, (see Steward file contents,) which was rejected upon reference to Buxton and others, and he then modified his claim as it now stands in his patent. I think he must be limited to the peculiar construction in which the connection between

the compressor arm and the needle arm, by use of the spring link, is direct; and any combination like the Buxton or Baker or Adams or Appleby, where an indirect spring connection was put in, is not an infringement. It is unnecessary to consider the defenses of prior use and others interposed, inasmuch as neither defendants infringe.

Steward patent, No. 272,598, February 20, 1883.—Alleged infringement by defendant McCormick Company of the third, fourth, ninth, and tenth claims, and by defendant Winona Company of the twentieth and twenty-first claims. Defenses: No infringement; want of novelty and patentability. The patent was granted for a "grain-binder," and the specification says:

"The object of my invention is to provide means that, combined with an automatic grain-binder, shall make it automatically regulate the position of the band on the gavel—that is, shall automatically place the band upon the gavel in its proper position, relative to the length of the grain, without any aid or attention from the operator; and its nature consists in locating, in such position as to be influenced by the heads of the incoming grain or gavel or bundle, a device to be moved thereby, the said device connected with means for adjusting the relative positions of the said grain and the binding mechanism."

The McCormick Company is charged with infringing—

"Third claim. The combination of the swinging revolving canvas for advancing the butts of the grain with the board, *e*, for retarding the heads of the same. Fourth claim. The combination, with the delivery apparatus of a harvester, of a self-setting plate, *e*, on the binder table, adapted to be operated by the grain for directing scattering grain into the succeeding gavel, substantially as described." "Ninth claim. In combination with the bundle-discharging mechanism of a grain-binder, the board, *e*, for the purposes set forth. Tenth claim. The combination of the discharge arms, the board, *e*, and the butt-adjusting mechanism, substantially as described."

The patentee describes the ordinary grain adjusting and butting mechanism found in many binders, which, he says, "constitute no part of the present invention, only as combined with other elements." At the top of the chute or deck, where the butts of the grain are delivered by the elevator, he places the grain-adjusting mechanism, which consists of a frame, D, carrying a roller at each end, around which rollers is drawn an endless canvas, called "*d*." This frame is pivoted so as to swing, and vibrates on the axis of the larger or upper roller, which is driven from the gearing of the harvester; and the endless canvas, in revolving, has a downward movement, and operates on the butts of the grain delivered from the elevator, and adjusts them before subjected to the binding mechanism. On the side of the deck, opposite the swinging revolving canvas, is a swinging board, *e*, pivoted to the harvester frame at its upper end, and nearly equal in width to that of the butt-adjusting canvas, for the purpose of retarding the heads of grain in its descent. The specification says:

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"The use of the canvas, *d*, and the board, *e*, produces a new and beneficial result in their joint action upon the grain, in grain that stands thin on the ground, and hence is of that condition which always passes up the elevators head first. The butts are advanced by the revolving canvas, and the heads are retarded by the contact with the board, *e*, and thus reach the binding receptacle in much better condition than when the old devices, or none, are used."

The board, *e*, has a spring, $e^1$, secured at one end at about middle of its length, and the other secured to the frame-work of the binder, and by this means the board is caused to press elastically towards the grain. The board, *e*, has an arm, $e^2$, secured "at its upper edge, and near its top or hinged end, the said arm reaching upward over and parallel with the decking, and connecting by a joint with the rod, $d^5$. By this means the movement of the board or plate, *e*, is transmitted to the adjuster, D, so that it moves in a reverse direction. In other words, the two parts, operating, one on the heads, and the other on the butts, of the grain, are so connected that they approach or recede from each other when one is moved. These parts, because of their weight, are inclined to swing apart, and also, because of the tendency of the motive power on the canvas, *d*, to swing its frame outward, and hence the spring, $e^1$, must be strong enough to overcome these tendencies, and as much stronger as is wished to have the parts moved quickly by the said spring when it is at liberty to move them. With the above-described parts in the positions shown in Fig. 3, and the bundle as there shown, it is plain that, if the bundle is quickly ejected, it must engage the curved part of *e*, and force it out of its way, and hence backward, and, the butting canvas being connected thereto, it will be moved forward. Two forces, then, are apparent,—the bundle to force the parts opposing its head and butt from each other, and the spring to retract them. In order that each bundle shall leave the parts fixed for the time being in any position it may have caused them to assume, I provide a locking device that shall at all times retain the parts, except just while the head of each bundle is passing the curve on the plate, *e*, which device is constructed as follows:" * * * A locking apparatus is then described in the specification, which is released when the bundle is discharged, and then engages with the board, *e*, 112 and holds it in the position in which it has been set by the outgoing bundle, until it shall be reset by any succeeding bundle. Each outgoing bundle, when it is operated upon by the discharge arms, tends by the movement communicated from the board, *e*, to the revolving canvas, to set the revolving canvas in a position to feed the grain further forward or further backward. Certain parts of the invention are said to be capable of use singly, as well as jointly, and the independent use of the board, *e*, is described, when the rods between the board, *e*, and the revolving canvas are disconnected, and the locking device is removed, and the rod attached to the butt-adjuster is fixed to the top of the deck by a pin. "I have an elastically swinging board for directing scatterings caused by imperfect anjustment of the reel of the harvester, or any other cause, into the gavel, whether the grain be long or short,

and especially when short, as without this board there is a clear space between the heads of the gavel and the rear limit of the chute, where scatterings may pass freely to the ground." The joint action is then described:

"With the parts all connected, as best shown in Figs. 2 and 3, I have, as before stated, a device for regulating the position of the grain relative to the binding mechanism, the operation of which I will now describe. * * * The cut grain falls on the platform canvas, and is conveyed to and elevated by the elevating canvases, and delivered in a loose state onto the table, when it is engaged by the usual pushing mechanism, and forced forward to the binding mechanism, where it is bound, and from which it is finally ejected by the discharge arms or other means. With the butting mechanism, and the board or plate, *e*, in their positions nearest approaching each other, we will suppose the grain first acted upon to reach them. If the grain is long, the head of the bundle, when discharged, will press forcibly against *e*, more especially against its curve, and force it backward, it being at the proper instant permitted to move by being unlocked by the action of the cam, $f^4$. The first bundle thus bound may be carried too far backward in its approach to the binding mechanism, and hence bound too near the butt: but, when it is discharged, the butt-adjusting device acts under the influence of the plate, *e*, and is hence moved forward to a position more nearly in keeping with the requirements, and the next bundle will be bound further from the butt. If, when going into a field of short grain, the butt-adjusting mechanism and plate, *e*, are wide apart, the first bundle will be deposited too far forward in the receptacle, and hence bound too near the heads; but, upon its discharge, the board, *e*, will be permitted to jump or swing with a quick movement to a position as far forward as the position of the bundle at that instant will permit, and hence the butting mechanism will be set for short grain. If the device is set to proper position for the first bundle before going into the grain, it will be properly bound, and it will leave the parts in position for the succeeding one. For the sake of clearness I will further say the butt-adjusting mechanism, in all cases, directs the grain to the binding devices, (except litterings, that are thrown backward.) The position to which the butt-adjuster is swung determines the relative position of the gavel to the binding mechanism. The passage of a bundle so long or far backward that its head will forcibly move the swinging plate, when the latter is unlocked, will cause the butt-adjusting mechanism to move forward, and deposit the succeeding grain in a position further forward in relation to the binding devices. If grain of decreasing length passes, the spring, $e^1$, will cause the plate, *e*, to jump, when unlocked, until it meets the heads of the same, and the butt-adjusting mechanism thus be moved to deposit the grain of each succeeding shorter gavel a little
113 further back in relation to the binding mechanism. * * *

The modifications that may be made in this arrangement are almost unlimited. For instance, the butting device may be of any kind competent to give the swath direction into the receptacle, or it may be of the kind that moves the gavel bodily endwise. The board or

plate, *e*, may be connected with the butting mechanism in various ways, and the plate, *e*, itself may be varied; yet, should any device be used capable of being influenced by the heads of the grain, whether in swath, gavel, or bundle, for the purposes set forth, I should consider it an equivalent. The spring, *e*', may be connected with the butting mechanism direct, as to any of the moving parts. The locking arrangement may be varied, and even dispensed with, under some circumstances. These suggested modifications are shown in an additional figure,—that numbered 7. In this the grain is shown as operated at each end by the two plates or boards; and it is plain that as the distance between these boards at their delivery end is regulated by the length of the grain, the butt-board will be caused to deliver the incoming grain properly. This would be used in that class of binders where the grain accumulates in the receptacle in a free state, and is taken bodily therefrom by the needle. The plate, *e*, may be located upon the elevator, and connected with the adjusting or butting mechanism, and produce the same effect."

In harvesters, boards for adjusting butts and heads of grain in their descent down the delivery board or deck, hinged and located on opposite sides, with a series of holes, in which pins may be placed, in the deck, to adjust the head or wind board, and in the arm attached to the butt-board, and thereby giving direction to the movement of the descending grain, for feeding it further forward or further backward, are old. Many resemble the boards of Steward, and represented in his diagram, Fig. 7, and will coact upon the grain, when adjusted, so as to present the gavel in proper shape for binding. Elward (May, 1876) described them in his patent, but the movement of one board did not communicate a movement in an opposite direction to the other. There was conjoint action only when adjusted by the operator. In 1877, Appleby and Bullock substituted a traveling butter for the adjustable butter-board. Steward's butting mechanism and board, *e*, differ from others in a conjoint action between them, which he describes, and also a conjoint action between the bundle-discharging mechanism of a grain-binder and the board, *e*, whereby the bundle-discharging mechanism imparts a positive movement to the outgoing bundle against the board, *e*, so that it is set for the incoming bundle. The purpose of Steward's invention is, by combination of the parts described, to adjust the butter-board forward and backward, with the board, *e*, so that, "whatever the length of grain which passes, its center will always be at the same place," and this is done through the connection described in the specification between the board or plate, *e*, and the endless canvas, *d*, by which it is made to swing backward and forward automatically, and thereby feed the butts of grain nearer to or further from the path of the needle. In the defendant's machines the butt-board or endless canvas is adjusted by hand to different fixed positions, and relative to the path of the needle; and this was a common method of construction before Steward. The adjustment of the endless canvas in the Steward patent, when discon-

nected from the board, $e$, is by hand, as the common method
114 before his invention; and the elastic pressure of the board, $e$, towards the grain is caused by the spring, $e^1$, when not restrained by the locking mechanism, and is thus adjustable as circumstances may require. The Deering circular of 1880, put in evidence, shows a board opposite the butter-canvas, constructed and adjusted as in defendant's machine. Chapman, in patent, June 19, 1877, and Buxton, in 1879, and Puetz, in 1880, have pivoted wind-board and butter attached to the deck, closely corresponding to the Steward board, $e$, and butt-adjuster, without the spring and rod connection. In September of 1881, McCormick substituted a spring for a pin behind the wind-board, (corresponding to board, $e$,) so as to give to it elastic and automatic adjustment. Gotlieb Heller also, in the spring of 1878, put a wind-board on his machine, and held it at an angle by a spring, using it during the harvest of 1878, and the next season, whenever the binder was used, until the machine was laid aside. Rubin, George Heller, Schlesener, and others corroborate him, and prove it beyond doubt that at that time he put a wind-board with a spring behind it, corresponding to board, $e$, of Steward, for retarding the heads, and keeping short grain or scatterings from falling down. In view of these devices used before the construction of his mechanism, Steward must be limited to the peculiar construction of mechanism by which the conjoint action is obtained of the board, $e$, and the swinging butter, D, and also to the combined action of the self-setting board, $e$, and the delivery, apparatus, operating in connection with butt-adjuster, whereby the bundle, as it passes out, fixes the position of the board, $e$, and the adjuster, D, for the succeeding gavel; and such combination of the bundle-discharging mechanism and the board, $e$, whereby the bundle-discharging mechanism imparts a positive movement to the outgoing bundle against the board, $e$, and at the same time sets it for the incoming bundle; and also to the conjoint action of the discharge arms, $j$ and $k$, the board, $e$, and the adjuster, D. He must be restricted to the exact combinations shown, which are not used by the defendant McCormick Company.

The two claims which it is insisted the Winona Company infringe are:

"Twentieth. The combination, in a grain-binder, of moving butt-adjusting mechanism, and the board, $d^1$, substantially as described. Twenty-first. The combination of the swinging butt-adjuster, the arms, $d^2$, $d^3$, and $d^4$, and the board, $d^1$, pivoted to the swinging butt-adjuster, substantially as described."

The Winona Company undoubtedly use the mechanism, operating in the same manner, as described in the Steward specification and claims. The only difference between the butt-adjuster in the defendant McCormick machine and the Winona is the attachment, $d^1$. The arms, $d^2$, $d^3$, and $d^4$, with the frame, D, when operated, move like a parallel rule, and constitute a parallelogram; thus keeping the board attachment, $d^1$, parallel to the edge of the chute. Heller had put on a similar attachment, pivoted to the end of a

butt-adjuster, in 1878; and, although the construction of
115–117 the adjuster and attachment was crude, it operated successfully, and embodied, substantially, the alleged invention described by Steward. Although Heller may have been in error when, in his deposition, he stated that the Exhibit "Heller Butt-adjuster, with Adjustable Extension," produced and put in evidence, was the identical device he put on his machine in 1878, the fact that he put on an extension to the butt-adjuster, and used it, is fully proved. Schlesener, who contradicts Heller on the identity of the Exhibit "Heller Butt-adjuster," and says that he and Heller put it on his machine in 1880, corroborates him in regard to a butt-adjuster, with extension, being on Heller's machine in 1878. My conclusion is that there is no infringement by the Winona Company of these claims.

Webster patent, No. 251,147, dated December 20, 1881.—Infringement by the Winona Company of the four claims alleged. This patent describes a mechanism for raising and lowering and fastening the grain platform. The object of this invention was to arrange mechanism to hold the grain end of the platform at any desired height from the ground, and permit of the easy adjustment of the platform to different heights. The parts are so combined and arranged that the operator can use the hand, which disengages the pawl, to assist, also, in raising and lowering the platform. This device, performing the same function in a different situation, has been in use for many years preceding Webster. It is found in a patent to Bacon, granted in 1838, for raising, lowering, and fastening windows, having the ratchet standard, the pawl, spring, and lifting handle, operating in substantially the same way as in Webster. The act of lifting disengages the pawl, and releasing of the hold upon the handle permits the pawl to engage. Such a device is used upon the windows of railway cars; and in addition to the notched window casing, for which the ratchet standard is the equivalent, and the pawl and its handle, there is a handle at the top of the window frame to aid in raising. There is no mechanical difference between the function of the two devices in Bacon and Webster, and there is no invention in using the sash-fastener mechanism for raising, lowering, and fastening a grain platform by making the parts larger and stronger. A combination of parts to perform a certain function, when patented, entitles the patentee to that combination in all situations for all analogous purposes. The alleged infringement cannot be sustained.

My conclusion, therefore, is that the bill against the defendant The McCormick Harvesting Machine Company must be dismissed, and the complainant is entitled to a decree only against the Winona Harvester Works and others for an infringement of the knotter patents, No. 278,639 and No. 301,190, and it is so ordered.

118 And afterwards, to wit, on the 31st day of March, A. D. 1890, the following decree was filed in the clerk's office of said court in the words and figures following, to wit:

119 & 120 United States Circuit Court, District of Minnesota.

WILLIAM DEERING
*vs.*
THE WINONA HARVESTER WORKS, C. L. Bonner, J. J. Randall, Casper F. Search, and C. H. Porter. } In Equity. No. 346, C.

This cause having been brought on for hearing upon pleadings and proofs and having been argued by Benjamin F. Thurston, Esq., and Thomas A. Banning, Esq., on behalf of complainant, and Messrs. Dyrenforth & Dyrenforth on behalf of defendants, and having been considered by the court, it is ordered, adjudged, and decreed that the equities are with the defendants and that the bill of complaint be dismissed at complainant's costs.

And thereupon complainant having moved for an appeal to the Supreme Court of the United States from the court's decision so far as it respects letters patents No. 223,812 and 272,598, it is ordered that such appeal be allowed upon complainant filing a bond in the sum of twenty-five hundred dollars, with good and sufficient sureties, to be approved by the clerk of this court, conditioned upon the payment of costs that have accrued or may accrue in this cause and be adjudged against said complainant.

R. R. NELSON, *Judge.*

We have no objection to the above form of entry.
DYRENFORTH & DYRENFORTH,
*Sol'rs for Defendants.*

(Endorsed:) Decree. Filed March 31st, 1890. Oscar B. Hillis, clerk.

121 And afterwards, to wit, on the 6th day of May, A. D. 1890, the following appeal bond was filed in the clerk's office of said court in the words and figures as follows, to wit:

122 Circuit Court of the United States, District of Minnesota.

WILLIAM DEERING
*vs.*
THE WINONA HARVESTER WORKS, C. L. BONNER, J. J. RANDALL, CASPAR F. SEARCH, and C. H. PORTER. } In Equity.

Know all men by these presents that we, William Deering, of Chicago, Cook county, Illinois, and Charles E. Richardson, of Minneapolis, Minnesota, are held and firmly bound unto The Winona Harvester Works, C. L. Bonner, J. J. Randall, Caspar F. Search, and C. H. Porter, the above-named defendants, in the sum of twenty-five hundred dollars ($2,500), to be paid to the said defendants, their executors, administrators, and assigns; to which payment, well and truly to be made, we bind ourselves and each of us, jointly and severally, and each of our heirs, executors, and administrators, firmly by these presents.

Sealed with our seals. Dated this 19th day of April, 1890.

Whereas the above-named complain-t has prayed and been allowed an appeal to the Supreme Court of the United States to reverse the decree rendered in the above-entitled action by the circuit court of the United States for the district of Minnesota so far as it relates to letters patent Nos. 223,812 and 272,598:

Now, therefore, the condition of this obligation is such that
123 if the above-named complainant shall prosecute said appeal to effect and answer all judgment, damages, and costs if he shall fail to make good his plea, then this obligation to be void; otherwise to remain in full force and virtue.

WILLIAM DEERING. [SEAL.]
CHARLES RICHARDSON. [SEAL.]

STATE OF ILLINOIS, }
*Cook County,* } ss:

I, A. L. Upton, a notary public in and for said county, in the State aforesaid, do hereby certify that William Deering, personally known to me as the same person whose name is subscribed to the foregoing instrument, appeared before me this day in person and acknowledged that he signed, sealed, and delivered the said instrument of writing as his free and voluntary act for the uses and purposes therein set forth.

Given under my hand and notarial seal this 1st day of May, 1890.

A. L. UPTON,
*Notary Public.*

[NOTARIAL SEAL.]

124 STATE OF MINNESOTA, }
*County of Hennepin,* } ss:

Be it known that on this 5th day of May, A. D. 1890, before me personally appeared Charles E. Richardson, of Minneapolis, Minnesota, to me known to be the same person described in and who executed the foregoing bond, and he acknowledged the same to be his own free act and deed.

M. A. SPOONER,
*Notary Public, Minneapolis, Minn.*

[NOTARIAL SEAL.]

STATE OF MINNESOTA, }
*County of Hennepin,* } ss:

Charles E. Richardson, of Minneapolis, Minnesota, the surety named in and who executed the foregoing bond, being by me first duly sworn, doth depose and say that he is a resident and freeholder of the State of Minnesota and worth the sum and amount of $5,000 above his debts and liabilities and exclusive of his property exempt from execution.

CHARLES E. RICHARDSON.

Subscribed and sworn to before me this 5th day of May, A. D. 1890.

M. A. SPOONER,
[NOTARIAL SEAL.] *Notary Public, Hennepin County, Minn.*

Approved.
R. R. NELSON, *Judge.*

(Endorsed:) Filed May 6th, 1890. O. B. Hillis, clerk.

125 And afterwards, to wit, on the 22nd day of July, A. D. 1890, the following stipulation as to evidence to be certified to supreme court was filed in the clerk's office of this court in the words and figures as follows, to wit:

126 Circuit Court of the United States, District of Minnesota.

WILLIAM DEERING
*vs.* } In Equity.
THE WINONA HARVESTER WORKS *et al.*

Whereas the complainant included in his bill herein several patents in addition to No. 223,812, issued January 27, 1890, to William F. Olin, and No. 272,598, issued February 20, 1883, to John F. Steward, and took evidence and introduced proofs in reference thereto;

And whereas the complainant has appealed from the decision of the court dismissing the bill herein so far as it related to said patents No. 223,812 and No. 272,598, but not as to the other patents included in the bill;

And whereas in the prosecution of the appeal it is desirable that only the evidence and proofs relating to said patents No. 223,812 and No. 272,598 should be certified up by the clerk of the circuit court in the transcript of the record to be filed on the appeal in the Supreme Court;

And whereas the complainant herein also begun and prosecuted in the above court a suit against the McCormick Harvesting Machine Company on said patents No. 223,812 and No. 272,598, in which suit the evidence for the complainant and the defendant was in most respects verbatim the same as in this suit, and in which suit the hearing was had at the same time as in this suit, and in which suit the decision of the circuit court was against the complainant, and in which suit the complainant has appealed from the decision of the court as to said patents No. 223,812 and No.
127 272,598, and in which suit the transcript of the record on the appeal to the Supreme Court will embody all of the evidence and proofs that should be included in a transcript of the record in this suit, except as hereinafter specified:

Now, therefore, it is hereby agreed that in the Supreme Court the record in the case of this complainant against the said McCormick Harvesting Machine Company shall be used and treated in every respect as the record on the appeal in this suit and be referred to

and used in argument in the Supreme Court the same as if separately certified up and printed at length in this suit, and that as at present advised the only parts of the record, evidence, and proofs which relate to said patents No. 223,812 and No. 272,598 which the clerk of the circuit court need certify up in the transcript of the record to the Supreme Court in this suit are the following:

The bill, answer, replication, orders, and the following portions of the evidence as the same appear in the printed copies of the complainant's record and defendant's record as used on the hearing herein:

Beginning on page 14 of the Complainant's Record with the words "Complainant's *prima facie* evidence," in the 1st line, and ending on page 15 with the words "various patents sued on," in the 5th line from the bottom.

Beginning on page 17 of the Complainant's Record with the words "Counsel for complainant offers in evidence," in the 19th line, and ending on page 24 with the words "therefore I consider it not material," in the 4th line.

Beginning on page 30 of the Complainant's Record with the words "Counsel for complainant offers in evidence," in the 10th line, and ending with the end of page 32.

128 Beginning on page 53 of the Complainant's Record with the words "Turning now to the Olin patent," in the 6th line from the bottom, and ending on page 63 with the words "a similar saving clause," in the 18th line.

Beginning on page 85 of the Complainant's Record with the words "Now turning to the Steward patent," in the 11th line from the bottom, and ending on page 90 with the words "No, sir," in the 12th line.

Beginning on page 97 of the Complainant's Record with the words "Redirect examination by Mr. Banning," and ending at the bottom of page 105.

Beginning on page 456 of the Complainant's Record with the words "Depositions taken on the part of the complainant," in the 14th line from the bottom, and ending on page 480, at the bottom of the page.

It is further stipulated and agreed, however, that if either party hereafter find, on a more careful examination of the record, that any evidence, proofs, or matters therein contained relate to and have a bearing on the validity, construction, or infringement of said patents No. 223,812 and No. 272,598, but are not included in this stipulation or in the transcript of the record certified up to the Supreme Court in the case of this complainant against the McCormick Harvesting Machine Company, then, if the matter cannot be arranged by stipulation, on filing an affidavit with the clerk of the circuit court certifying up the transcript of the record as above, specifying the part or parts omitted and stating that such part or parts relate to said patents or either of them and are necessary or proper, in his opinion, to a proper determination by the Supreme Court of the validity, construction, or infringement of said

129 patents or either of them, the said clerk shall certify up the

matter so specified and tax the costs against the appellant, but if the clerk for any reason refuse or neglect so to do a motion may be made in the Supreme Court suggesting a diminution of the record and asking to have the omitted part certified up the same as in other cases where no stipulation as to what should be certified up as a transcript of the record has been made. If, however, no addition to the transcript of the record be seasonably made, then on the argument of the appeal the record shall be considered and treated as in all respects complete.

It is further agreed that all models, exhibits, documents and other instruments of evidence that are offered in the depositions specified above and not specifically enumerated herein are included in the record to be argued on appeal herein, and are to be produced on such argument by the party having the custody of the same, and that pending the appeal they shall be subject to the examination and inspection of the other party for the preparation of his brief.

Chicago, April 29, 1890.

BANNING & BANNING,
*Solicitors for Complainant.*
DYRENFORTH & DYRENFORTH,
*Solicitors for Defendants.*

(Endorsed:) Filed July 22, 1890. O. B. Hillis, clerk.

130 *Complainant's Prima Facie Evidence.*

Testimony on the part of complainant, taken January 20, 1886, in the case of this complainant against The Winona Harvester Company, and by agreement of parties stipulated this 3d day of June, 1886, into the above-entitled cause, with such changes as to name of machine as makes the same applicable to this cause, with additional examination and cross-examination by Mr. Thomas A. Banning and Joseph G. Parkinson respectively.

Present at the original taking: Thomas A. Banning, of counsel for complainant, and Philip C. Dyrenforth, of counsel for defendant.

Also assignment of all the right, title, and interest of Elijah H. Gammon in and to said letters patent No. 191,264, to William Deering, the complainant, recorded in Liber C 27, page 170, of Transfers of Patents.

William S. Bates, a witness produced, sworn, and examined on the part of complainant, in answer to questions by Mr. Banning deposed and testified as follows:

Q. 1–1. State your name, age, residence, and occupation.

A. William S. Bates; age, 33; residence, Chicago, Illinois; occupation, civil and mechanical engineer.

Q. 2–2. State what experience you have had, if any, in mechanical pursuits, examining letters patent and mechanical devices, and as an expert in patent cases.

A. I have been engaged in mechanical studies and pursuits for some fifteen (15) years last past. In the practice of my profession I am daily brought in contact with mechanical devices of various kinds, and am required to examine the same critically and
131 analytically for various purposes. I was at one time engaged as a solicitor of patents, and became familiar with drawings and specifications of patents in general, and for a number of years I have been very frequently called to testify as a mechanical expert in patent cases.

Q. 3–3. State whether you have examined letters patent No. 191,264, sued on, and whether you understand the construction and operation of the same.

A. I have examined and believe I understand the same.

Q. 4–4. Look at this model which I now show you and state whether or not it represents the combination of parts described and claimed in any of the patents sued on; and, if so, what one.

A. The model correctly represents the combinations and devices set forth in the fourth (4), fifth (5), and sixth (6) claims.

Q. 5–5. State how you find the specifications and drawings of the patent sued on as to their fullness and clearness to enable a person skilled in the art to manufacture and use invention described and claimed.

A. They are sufficiently full and clear to enable such a person to manufacture and use the invention.

Counsel for complainant offers said model in evidence, and the same is marked "Steward model 191,264."

Q. 6–6. Look at this full-sized self-binding harvester before you, marked "Winona," and state whether you have examined and understand the construction and operation of the same.

A. I have examined it and believe I understand its construction and operation.

Counsel for complainant asks counsel for defendant whether he will admit that the full-sizes self-binding harvester referred to in the previous question is one of the defendant's manufacture, and
132 that they have manufactured and sold such harvesters prior to the filing of the bill in this case and after the issuance of the various patents sued on.

By Mr. DYRENFORTH: The machine referred to is a Winona binder, and machines of this description were manufactured and sold by the defendants before the commencement of this suit and after the issuance of the various patents sued on.

Counsel for complainant offers in evidence certified copy of letters patent of the United States No. 223,812, issued January 27, 1880, to William F. Olin, of Chicago, Illinois, being one of the letters patent sued on in this cause.

Also assignment of all the right, title, and interest of said Olin in and to said letters patent No. 223,812, sued on, to William Deering, the complainant, dated the 27th day of November, 1883, unrecorded.

By Mr. DYRENFORTH: I object to the instrument of assignment

offered by the complainant on the ground that it is unrecorded and that there is no proof that it was executed upon the date it bears or prior to this suit.

I request counsel for the complainant to make on the record the statement which, after the above objection was entered, he frankly made off the record concerning the assignment referred to and which explains the singularly fresh appearance of the ink in that instrument.

Counsel for complainant states that the particular assignment offered in evidence under the Olin patent was executed this morning, but that it is a repetition or re-execution of an assignment that was actually executed and delivered previous to November 27, 1883, from the said Olin to the said Deering under the said patent, which has become lost and cannot now be found. The facts about this matter can be ascertained from John F. Steward, whom we expect to call as a witness in this cause, and we now so inform de-
133 fendant's counsel, so that he may inquire more fully into the matter, if he desires, when Mr. Steward is called as a witness.

By Mr. DYRENFORTH: In view of the statement of counsel for complainant, *and* instrument of assignment is further objected to as incompetent and void for the purpose of this suit.

The offers of the letters patent No. 223,812 is objected to, since the legal title thereto is not shown to have been in complainant at the time this suit was commenced.

Q. 9–9. Look at the letters to Olin offered in evidence and state whether you understand the construction and operation of the combinations and devices therein described and claimed.

A. I have examined and believe I understand the same.

Q. 10–10. What would you say about the clearness and plainness of the specification and drawings of said patent to enable a person skilled in the art to manufacture and use the combination and devices therein described and claimed?

A. In my opinion they are sufficiently clear and plain to enable such a person to manufacture and use the invention.

Q. 11–11. Look at the defendant's binder before you and compare the combination and devices therein contained with the claims of the Olin patent sued on, and point out its resemblances, if any, to the combinations and devices claimed in said Olin patent; and if, in your opinion, said binder contains the combinations and devices claimed in any of the claims of the patent sued on, point out what claims, and give your reason at length for any opinion you may express.

A. I have made the comparison. In my opinion the defendant's binder contains the combinations set forth in the Olin patent and more particularly recited in the first, second, third, fourth, and sixth claims.

My reasons for this opinion are as follows:

The first claim of the Olin patent is in the following words:
134 "In combination with a harvester elevator, a swinging elevator pivoted at its lower end and suitable devices for shifting

its upper end, whereby the swinging elevator forms a means for elevating the butts of the grain and delivering grain of different lengths at the same points, substantially as specified."

In binding machinery of the kind in controversy the grain is received upon the carrier platform and elevated from it to the point where it is bound. In many cases in being thus elevated it is carried to a higher level than that where the binding is done, and therefore des-ends a short distance to reach the binders. The machine illustrated in the Olin patent is one of this class. In it the grain is elevated from the carrier platform H to the point P, where it is to be bound. This is done by means of an endless belt or belts. In order that long and short grain may be delivered at the same point, a second endless belt is provided, which engages the butts of the grain and pushes the same back so as to bring the middle of the swath to the desired point. This second endless belt is marked Q in the drawing, and is so arranged that it not only pushes the grain back, but also acts as a conveyor to move the butts forward in their path to the binder. As shown and described in the patent, this belt Q is arranged with one end low down near the carrier platform H and the other end up near the highest point of travel of the grain, but it is obvious that these positions might be changed and the device still operate in exactly the same way *was* to push the grain back and to convey the butts forward. For example, the receiving end of the belt Q might be further along on the path of the grain, even at the highest point on its path or beyond it, and the delivery end also farther along, even at the point P or near it. It is also obvious that whatever the position of the belt Q on the machine its delivery end must be moved back and forth to accommodate grain of different lengths, as the short grain must be pushed further back than longer grain.

I therefore understand the essentials of this device to be that it shall be combined with the devices which elevate or convey the grain from the carrier platform to the binder; that it shall be pivoted at its receiving end so that its delivery end may swing back and forth to accommodate grain of different lengths, and that its delivery end shall be provided with devices by which it may be moved back and forth for that purpose, and that it is immaterial at just what point in the path of the grain said swinging belt or conveyor Q is located.

This is the combination which I understand to be meant by the first claim of this Olin patent, namely, the conveyor which elevates the grain from the carrier platform to the binder, the swinging conveyor which engages the butts of the grain and pushes them back so that the bundle will be certainly bound and assist in conveying said butts to the binder, the pivot at the receiving end of the swinging conveyor, and devices for shifting the delivery end of the same.

I am aware that in the first claim the said swinging conveyor is spoken of as being pivoted at its "lower" end and having shifting devices at its "upper" end, but I understand these words lower and upper to be merely designatory and used because in the location

shown it is the lower and upper ends of the device which are referred to, though if the device were differently located these words might have to be transposed to be literally accurate. If the patentee had used the words receiving and delivery, such transposition would not be necessary. I am also aware that in the
136 claims the device is called an elevator, and this is correct, but, perhaps, slightly misleading, as whatever its position in a machine of the class illustrated in the patent it assists in elevating the grain from the point H to the point P, even though it were so located that it acted on the grain only on the downward portion of its path.

Turning to the defendant's binder, I find it to be a machine in which the grain falls onto a carrier platform and is carried from it or elevated to the binding devices, which are located at a higher level on the other side of the driving wheel.

The elevator or conveyor in this defendant's machine, which conveys the grain from the carrier platform to the binder, is composed partly of two endless canvasses, between which the grain is conveyed to the highest part of the travel, and partly of toothed arms, which convey the grain forward to the binders, the latter being located in the downward portion of the path of the grain. Combined with this dual conveyor is a swinging conveyor of the same identical construction as that shown in the Olin patent—that is to say, it is composed of an endless belt moving on pulleys and so arranged as to act on the butts of the grain and convey them forward in their path to the binder, and at the same time push the straws endwise so as to bring them to the proper point to be bound centrally. This swinging conveyor in the defendant's machine is pivoted at its receiving end and its delivery end provided with devices for shifting it to accom-odate grain of different lengths. The function, operation, and purpose of this swinging conveyor in the defendant's machine are identical with those of the swinging conveyor in the Olin patent. It pushes the straws endways so as to deliver them centrally to the binder, exactly as Olin's does. It forwards the butts on their
137 path exactly as Olin's does. It is combined with the mechanism which elevates or conveys the grain from the carrier platform to the binder. So is Olin's. It is pivoted at its receiving end, as in Olin's, and its delivery end swings, as does Olin's, but the mechanism for shifting the delivery end is slightly different in the two machines. In the defendant's machine a sliding bar is used, and in the Olin a sliding bar and lever. The only differences between them are in the form of the main elevator or conveyor with which the swinging elevator is combined and in the fact that in the defendant's machine the swinging conveyor is located near the end of the path of the grain to the binder, while in the Olin it is near the beginning of that path.

Therefore, as the defendant's machine contains all the elements of Olin's first claim combined together and operating in the same way, with only such differences as do not effect their function or operation, I say that the defendant's machine contains the invention set forth in the Olin patent and claimed in the first claim thereof.

The second claim of the Olin patent, as I understand it, is for combination of the main elevator or conveyor of the harvester and the adjustable conveyor or belt Q when the latter has its pulley arranged parallel with the upper surface of the main conveyor.

I have already explained that the main elevator or conveyor which acts upon the body of the grain and the swinging or adjustable conveyor or belt Q which acts upon the butts of the grain are combined together in the same manner for forwarding the grain on its path to the binder in the defendant's and Olin machines. It will suffice, therefore, to add that the wheels or pulleys of the belt of the swinging or adjustable conveyor in the defendant's machine are parallel to that part of the main conveyor with which
138 said belt is in conjunction, and that the two act together in the same way, and that the butts are carried or delivered even with the heads to the binder in both the defendant's and the Olin machines. Therefore I find in the defendant's machine the invention claimed in the second claim of the Olin patent.

The third claim of the Olin patent, as I understand it, is for the adjustable conveyor or belt Q, combined with the main conveyor, and having its receiving end advanced in front of the line of grain travel. The object of this, as I understand it, is to have the grain delivered straight to the adjustable conveyor, so that it will be properly acted upon by the latter.

Turning to the defendant's machine, I find in it the receiving end of the adjustable belt or conveyor is advanced in front of the line of grain travel, so that the butts of the grain come squarely against it, instead of being bent back by it, exactly as they do in the Olin machine, and therefore this third claim of the Olin patent perfectly describes the defendant's machine, bearing in mind, of course, the explanation I have made of the words lower and elevator. Therefore the defendant's machine contains Olin's invention as recited in the third claim of his patent.

The defendant's machine does contain the invention set forth in the Olin patent and claimed in the fifth claim thereof for the following reasons:

Said inventions relates more particularly to the mechanism for driving the butt-adjuster. As defined in the claim it is a combination of the following elements: The shaft W, which receives motion from the mechanism of the harvester; the wheel *h*, which is a beveled gear mounted on a shaft, W; the gear wheel *g*, which is a beveled gear mounted on the butt-adjuster frame and meshing with the wheel *h*.

139 The pulley wheel *d*, which forms the driving pulley for the butt-adjuster belt and is secured to the wheel *g*, so as to move with it.

The frame I, which connects the wheels *g* and *h* and keeps them constantly in gear.

As shown and described in the Olin patent, this mechanism is applied to the swinging end of the butt-adjuster, but the patent states that it may be applied to the other end—namely, the pivoted end. As shown and described, the frame is so formed as to have two arms

parallel to each other and a connecting piece. In other words, in the shape of a V. The wheel *h* is between the two arms of the frame *i*, so that whichever was the butt-adjuster swings the wheel *h* will go with it. Obviously, if this mechanism be located at the pivoted end of the butt-adjuster it will be unnecessary to have two arms embracing the wheel *h*, and the construction of frame *i* may be simplified and cheapened by omitting one of said arms. The truth of this will be apparent when we turn to the defendant's machine. In the defendant's machine the mechanism for operating the butt-adjuster *it* applied to the pivoted end. This mechanism consists of certain instrumentalities, to wit:

A shaft corresponding to Olin's shaft W, extending across the harvester and receiving motion from the main gearing of the harvester. This shaft, like Olin's, also carries the upper roller of the main elevator butt of the machine.

A bevel gear wheel mounted on the shaft.

Another bevel gear wheel mounted on the butt-adjuster frame and meshing with the first-mentioned gear.

A pulley wheel, which forms the driving pulley of the butt-adjuster belt connected to the last-mentioned bevel gear, so as to move with it.

140 A frame which connects the two bevel wheels, or rather their shafts, and keeps them constantly in gear. These parts, except the frame, are all just like the analogous parts of the Olin mechanism, and the frame differs from Olin's only in the omission of one of the arms which is rendered unnecessary by reason of the mechanism being applied to the pivoted instead of the swinging end of the butt-adjuster. These parts are all combined together and operate in the same way and perform the same function in the defendant's machine as in the Olin patent and the result secured is the same.

For those reasons, namely, that the defendant's machine contains all the elements of Olin's fifth claim and in exactly the same combination, I say that it contains Olin's invention as defined in said fifth claim.

The sixth claim of the Olin patent is in terms for a combination of—

The elevator or belt Q, the inclined board R, and the main elevator.

As already explained, the main elevator is the mechanism which conveys the grain from the carrier platform to the binder.

The belt Q is the adjustable conveyor which acts upon the butts of the grain.

The inclined board R is a covering board over that portion of the main conveyor which is in conjunction with the belt Q. This board acts to hold the grain down within the action of the main conveyor and the belt Q.

In the defendant's machine I find over that part of the main conveyor which is in conjunction with the belt Q an inclined cover formed of sheet iron, which holds the grain down within the action of the conveying mechanism and prevents its being thrown out or

blown away exactly as does the inclined board R in the Olin
141 patent. The only difference between the two is that the inclined cover of the defendant's machine is on the downward portion of the path of the grain, whilst in the Olin it is on the rising portion. This difference does not effect the function or operation of said inclines cover in the slightest degree.

Therefore I find in the defendant's machine the exact combination of the sixth claim of the Olin patent.

In making this statement I have borne in mind that the inclined cover R of the Olin patent is spoken of as the "board" and in the defendant's machine it is made of metal. This, however, does not effect its function, operation, purpose, or form. Therefore I consider it not material.

Counsel for complainants offers in evidence certified copy of letters patent of United States 272,598, issued Feb. 20, 1883, to John F. Steward, of Chicago, Ill., being one of the letters patent sued on in this cause.

Also assignment of all the right, title, and interest of the said Steward in and to said letters patent to William Deering, of Chicago, Ill., dated June 8, 1885, unrecorded.

By Mr. DYRENFORTH: The instrument of assignment last offered is objected to on the ground that it is not recorded and there is no evidence to show it was executed on date it bears or prior to the commencement of this suit.

Q. 19–16. Look at letters patent 272,598, sued on, and state whether you understand same, and particularly the combination and devices shown and described in the third, fourth, ninth, and tenth claims of said patent, and state whether you understand the construction and operation of such combination.

A. I have examined and believe I understand the same.

Q. 20–17. What would you say as to the clearness and sufficiency of the specification and drawings of said patent to enable
142 a mechanic skilled in the art to construct and operate the combinations or devices described and claimed in said claim?

A. In my opinion, the specifications and drawings are sufficiently clear to enable such a mechanic to construct and operate — invention.

Q. 21–18. Look at the defendant's binder before you and state your opinion as to whether or not it contains the combinations described and claimed in the third, fourth, ninth, and tenth claim of the patent sued on, giving your reasons for any opinions you may express.

A. I have compared the defendant's binder with the Steward patent, 272,598, referred to and find that it does contain the improvements set forth in said patent and claimed in the third, fourth, ninth, and tenth claim thereof.

My reasons for saying this are — follows:

The third claim of the Steward patent is for the "combination of the swinging revolving canvas for advancing the butts of the grain with the board *e* for retarding the heads of the same." The swing-

ing revolving canvas referred to in this claim is the butt-adjusting belt referred to in discussing the Olin patent. The board *c* is a swinging board at the opposite — of the deck, pivoted at its receiving end and having its delivery end free to oscillate toward and from the butt-adjuster. The purpo*r*s of the combination is very clearly set forth in the following language in the specification: "The use of the canvas *d* and the board *c* produces a new and beneficial result in their joint action on the grain in grain that stands thin on the ground, and hence is of that condition which always passes up the elevator's head first. The butts are advanced by the revolving canvas and the heads are retarded by contact with the board *c*, and thus reach the binding receptacle in much better condition than when the old devices, or none, are used."

Turning to the defendant's binder, I find in it, as already
143 explained in discussing the Olin patent, the swinging revolving canvas for advancing the butts of the grain. This swinging revolving canvas is in the same identical position with respects to the other parts of the machine that it occupies in the Steward patent 272,598. At the opposite side of the deck from the swinging canvas in the defendant's machine there is a board occupying the same relative position as Steward's board *c*. This board is pivoted at its receiving end like Steward's board, and its delivery end is free to oscillate toward and from the butt adjuster like Steward's board. This swinging board in the defendant's machine is obviously adapted to and does co-operate with the swinging canvas in their action upon the grain. The swinging canvas advances the butts, and the board retards the heads so that the grain is delivered more evenly to the binding mechanism than would otherwise be the case, just as it is the Steward arrangement.

For these reasons, therefore, that I find in the defendant's binder the same identical devices combined and operating in exactly the same way and accomplishing the same purpose as those recited in Steward's third claim, I say that the defendant's binder contains the combination of said third claim.

The fourth claim of the Steward patent 272,598 is for the "combination, with the delivery apparatus of a harvester, of a self-setting plate, *a*, on the binder table adapted to be operated by the grain for directing scattering grain into the succeeding gravel." The plate *c*, referred to in this claim, is the same plate as board *c*, referred to in the third claim. This plate is caused to swing toward the middle of the deck by a spring. If this spring b*o* of the proper tension, any scattering grain—that is, grain which is thrown back o*r* wrong end by the reel, or otherwise gets out of position—will be directed toward the middle of the bundle, and will be caught and
144 bound into the gravel, instead of falling on the ground and being lost.

In the defendant's binder, as already explained, there is a board corresponding exactly to Steward's board or plate *c*. This board in the defendant's will have the same effect upon scattering grain of directing it into the gravel that the Steward board has. The delivery ap-aratus of the defendant's binder is identical with

that of the Steward machine. Therefore the defendant's binder has all the elements of the Steward fourth claim, and they operate in conjunction in the same way and accomplish the purpose stated. Therefore I say that the defendant's binder contains the combination claimed in the said fourth claim of the Steward patent No. 272,598. The spring in the defendant's is a little differently arranged from the spring of the Steward, as it acts on the back of the board to push it forward, whilst the Steward spring acts from in front to pull the board forward. This difference, however, is not material, as the operation and effect are the same and as springs have been used both ways—that is, for pushing and pulling—long prior to the date of this patent, and the two forms of springs were well-known equivalents of each other.

The ninth claim of the Steward patent is for the combination with the bundle-discharging mechanism of a grain-binder of the board *c*.

The bundle-discharging mechanism in *the* both the Steward machine and the defendant's machine consists of two arms mounted upon the binder-operating shaft and revolved by it so as to push the bound bundle out from the binding mechanism and off the deck. The discharging mechanism is identical in all respects in the two machines. The board *c* is identical in the two machines, as already explained. These two devices have the same relation to each other exactly. Therefore the defendant's binder contains the combination of Steward's ninth claim.

145 The tenth claim of the Steward patent is "the combination of the discharge arms, the board *c*, and the butt-adjusting mechanism." As already explained, these three parts exist in the same in the defendant's binder as in the Steward patent. They perform the same functions, they operate in the same way, and the purpose accomplished is the same. Therefore the defendant's binder contains the combinations of the tenth claim of Steward's patent No. 272,598.

Cross-examination by Mr. DYRENFORTH:

X Q. 133–116. Turning now to the Olin patent No. 223,812, please state whether you find in that patent any statement to the effect that the butt-evener may be placed upon the binding instead of the elevating side of the machine and thus beyond the elevation aprons and at about a right angle with them instead of paral-el with them.

A. The patent contains so such statement.

— Q. 134–117. So far as you know, was Olin the first to apply to grain-binders a device for causing the butts of the grain to be delivered to the binding mechanism in horizontal line with the heads?

A. So far as my personal knowledge goes he has.

X Q. 135–118. And your testimony on the direct examination has been given under this impression, has it not?

A. Not particularly. That impression had no special effect on

my testimony. I testified under the belief, however, that Olin was the first to apply the combinations which he claims.

X Q. 136–119. Do you know whether any harvesting machine was ever yet constructed with the butt-evening device over the elevator and parallel with it as shown, described, and specifically claimed in the Olin patent No. 223,812?

146 A. The defendant's machine before me is such a machine. It has the butt-evener, to be sure, on the downward portion of the elevating path of the grain. I don't know of any machine being constructed with the butt-evener on the upward portion of the elevating path just as shown in Olin's drawings.

X Q. 137–120. You say just as shown in Olin's drawings. How about Olin's description?

A. It is also included in my answer.

X Q. 138–121. In order to make the defendant's machine infringe the Olin patent you have to construe the expression pivoted at its lower end to mean pivoted at its upper end; this expression, "devices for shifting its upper end," to mean devices for shifting its lower end, and the expression "elevating the butts of the grain" to mean accelerating the downward progress of the butts, do you not?

A. Not exactly. I construed "pivoted at its lower end" to mean pivoted at its receiving end, and "shifting its upper end" to mean shifting its delivery end, and "elevating the butts" to mean conveying the butts. This is evidently correct mechanically, for if you take the machine and tilt it up so that the butt-adjuster is on a level or on a downward incline and feed grain over it, there would not be one particle of difference in its action, and you might take the defendant's machine and take the slotted platform with the toothed arms, the binding mechanism, and the butt-evener and put them on the other side of the ground wheel, in the position now occupied by the endless elevating canvasses, and their operation would then be identical with what it now is and the location and arrangement of the parts would be within the strictest literal construction of the Olin claim.

147 X Q. 139–122. Is the butt-evener on the defendant's machine over the elevating canvas?

A. No; it is over another part of the elevator or elevating mechanism.

X Q. 140–123. Is it hinged at its upper or at its lower end?

A. At its upper or receiving end.

X Q. 141–124. Do the shifting devices shift its upper end or its lower end?

A. Its lower or delivery end.

X Q. 142–124. I will ask you again, Mr. Bates, whether you know of any harvesting machine ever having been made as shown and described in the Olin patent.

A. Not exactly that shown and described. The defendant's and a Deering machine that I have seen are very much like it, or as near as any machines that I know of as having been actually made.

X Q. 143–126. Do you know whether any machines of the pres-

ent day have the butt apron parallel with the elevator on the elevating side of the machine?

A. If you mean on the rising portion of the path of the grain, I have no actual knowledge of such machines.

X Q. 144–127. Do you know whether Olin was the first to construct a butt apron traveling independently of the elevator apron, but parallel with the elevator and on the same side of the machine?

A. I do not.

X Q. 145–128. Where is the device referred to in the Olin patent as the roller I?

A. It is between the carrier platform and the beginning of the elevator.

148 X Q. 146–129. Now, please look at the specification of the Olin patent and state what Olin says about the relation of that roller to what he calls the elevator belt Q, which is the butt-evener.

A. All that I find is on page 4 from line 94 on, in which he says that the teeth *b* will engage with the butts of the grain on the roller I, and also that the lower pulley *c* is so arranged that it will permit the teeth *b* to clear the end of the roller and engage the butts. That is all I see on that point; that, of course, applies to the specific location shown in the drawings which the specification describes.

X Q. 147–130. From lines 55 to 60 on page 4 of the Olin specification, do you find any statement relating to the length of the elevator Q? And, if you do, please state in your own words what you understand it to be.

A. The paragraph referred to simply states that the butt-evener need not extend the entire length of the elevator. This statement is particularly *revelent* in view of the fact that in the defendant's machine the butt-evener does not extend the entire length of the elevator.

X Q. 148–131. But in saying that the belt Q need not extend the entire length of the elevator, where does Olin specifically define that it shall begin?

A. He doesn't say.

X Q. 149–132. Does he not say the *the* elevator Q need not extend the entire length of the elevator, but may stop some distance below the upper elevator roller, and does he not say that the lower end of the elevator Q is to be close to and in a certain relation to the lower roller I, and does he say that the lower end of the elevator Q is to be in any other situation or may be in any situation that the one I have named?

149 A. In speaking of the combination of the roller I with the butt-evener Q Olin does say substantially that the lower end of Q is to be close to I, but in speaking of his other combinations he, of course, does not put any such limitation on the position of Q, as it obviously does not need to occupy that particular position. He does not actually say directly that Q shall occupy any other position, but he does say that Q can be used with other forms of elevators than the one shown to accomplish the same re-

sults. Just what he has in mind in making that statement I don't know; probably it was some such arrangement as that of the defendant's machine, as the language clearly applies to it.

X Q. 150–133. Does he say anything about using it with any other form of elevator in any different situation than the one he defines?

A. Not in so many words, but, of course, the difference of location is implied when it is necessary. In the defendant's machine the difference in location is necessary, because the rising portion of the elevator in that machine is forward of two canvas nets, between which the grain is held, and if they were far enough apart to admit the butt-evener they would be too far apart to hold grain.

Adjourned to Monday morning at 10 o'clock.

MONDAY, *January* 25, 1886—10 o'clock a. m.

Parties met pursuant to adjournment.

Present: Same as before.

X Q. 151–134. In the Olin patent now under consideration what is the part marked $M^1$?

A. It is a board under the belts of the elevator and is called the backing board in the specification.

X Q. 152–135. Is that a fixed board?

A. Yes, sir; I so understand it.

X Q. 152–136. What are the parts M?

A. They are the belts of the elevator.

150 X Q. 153–137. What are the parts *a*?

A. Teeth or slats on the belt.

X Q. 154–138. Do you find the parts *a* mentioned indiscriminately in the specification as teeth or slats?

A. They are called teeth. They would be slats, however, if they were long enough.

X Q. 155–139. Then I am right in saying that the elevator in the Olin patent consists of a series of bands *traveling* upon rollers over a wooden backing and provided with teeth for *a*ngaging the grain and carrying it upward.

A. Yes, sir.

X Q. 156–140. What is the part R?

A. R is a cover to keep the grain within the action of the elevator and butt-evener and to prevent its being blown away.

X Q. 157–141. Does it travel or is it fixed?

A. It is stationary.

X Q. 158–142. What are the parts $S^1$?

A. They are arms or fingers which form another portion of the cover, of which R is one portion.

X Q. 159–143. Are they stationary and parallel with the backing board $M^1$ like the board R as far as the backing board extends?

A. They are stationary and parallel with $M^1$ where they are over it. Their ends, however, are curved so that they are parallel with the swath throughout their length.

X Q. 160–144. How many bars S[1] would there be in an Olin machine?

A. Three or four or five. The patent does not say how many.

151 X Q. 161–145. Suppose that the board R and the bars S[1] were supplanted by a continuous board, forming a cover between which and the backing board M[1] the grain was carried up by the elevator belts, what effect would *what* have upon the operation of the Olin machine?

A. None at all that I see.

X Q. 162–147. In the Olin machine at what speed does the belt Q travel with relation to the speed of the elevator belts M?

A. It travels a little faster.

X Q. 163–148. How many times as fast?

A. As shown in the drawing, Q would travel about 25 per cent. faster then M, but this is not conclusive, as these drawings are not made to scale generally.

X Q. 164–149. Supposing that to be so, would not the butts, when they reached the upper end of the elevator, *he* higher than the heads?

A. If they started even probably they would, but as a matter of fact they do not generally start even. The butts are dragged across the standing grain by the carrier platforms so that the heads get ahead of the butts, except in a very long grain, and the effect of the belt Q is to get the butts even with the heads again before the grain reaches the binding mechanism.

X Q. 165–150. Do all the belts M travel with the same speed?

A. Apparently they do, though there is nothing positive on this point.

X Q. 166–151. Would it be possible for the belts M to travel at different rates of speed with the mechanism shown in the Olin drawings?

152 A. Yes, sir. If the long rollers over which the belts run were larger at one belt than at the other the belt on the largest portion would run faster than the others.

X Q. 167–152. Does that condition exist in the Olin drawings?

A. Apparently not, but the drawings have so many shade lines on them that it might be so. My understanding, however, is that all the belts M run at the same speed.

X Q. 168–153. Is it your understanding also that each transverse series of teeth "*a*" travels up in a horizontal line?

A. They may or may not. Probably in 99 cases out of 100 they would not. It would depend upon just how the belts happen to be put on.

X Q. 169–154. In which way is a *whisp* of grain most liable to catch and be obstructed, when pushed head foremost or in the contrary direction?

A. When pushed on end foremost.

X Q. 170–155. What do you mean by the expression "when pushed on end head foremost"?

A. I mean when given motion in the direction of its length, the head going first.

X Q. 171–156. Now state, please, whether, in your opinion, the combined operation of the toothed butt-elevator belt Q and the toothed elevator belts M, the elevator belt Q inclining at its upper end inward toward the elevator belt M and traveling about one-quarter faster than the toothed elevator belts M, would be to straighten the grain, bringing the belts in even line with the heads and pushing the short grain head foremost, so that it might be bound at about the middle or to bend the grain toward the butts and tangle and disarrange it?

A. It would be to straighten the grain, bringing the butts in line with the heads. It would also act to push short grain back
153 head foremost, so that it would be bound about the middle. It might, of course, bend the butts of individual straws here and there where such projected very much beyond the edge of the swath.

X Q. 172–157. In the defendant's machine are the pulleys and wheels of the adjuster-butt apron arranged with their faces parallel with the upper surface of the main elevator?

A. Yes, sir; that portion of it with which the butt-adjuster is combined. They are not parallel with the other portions of the main elevator.

X Q. 173–158. You call the deck of the defendant's machine upon which the grain is delivered by the elevator and down which it slides the elevator, do you?

A. The deck you speak of together with the toothed packing arms constitute a part of the elevator, as the grain is conveyed by them in its progress from the carrier platform up to the binder mechanism.

X Q. 174–159. Where is the grain delivered in the Olin machine?

A. At about the point N.

X Q. 175–160. Does it fall upon a deck there?

A. It drops onto a platform marked P in the machine shown in the drawings.

X Q. 176–161. Is that platform P part of the elevator in the Olin machine?

A. No.

X Q. 177–162. Where is the grain bound in the Olin machine?

A. On the platform P, if anywhere.

X Q. 178–163. Does it slide down anything on its way to that platform?

A. It may slide a short distance over the fingers N before it drops.

154 X Q. 179–164. Are the fingers N and the space through which the grain drops part of the elevator?

A. Strictly speaking, they are part of the path of the grain as it is elevated from H to P. If they were provided with conveying devices it would certainly be part of the elevator. The downward portion of the path of the grain just above the point N, in figure 1,

is provided with conveying devices and is unquestionably a part of the elevator.

X Q. 180–165. Is the butt apron in the defendant's machine arranged with relation to the main elevator as described in the Olin, and has its lower end advanced in front of the line of travel?

A. Yes, sir.

X Q. 181–166. Which claim of the Olin patent do you regard as being most clearly infringed by the defendant's machine?

A. I should say the infringement was pretty clear of all the claims in controversy, though perhaps the defendant's machine comes nearer the exact terms and words of the fourth and sixth claims than of the others.

X Q. 182–167. Is the infringement of the second claim as clear to you as the infringement of the first?

A. Yes, sir.

X Q. 183–168. Is the infringement of the third claim as clear to you as the infringement of either the first or second?

A. It is.

By Mr. DYRENFORTH: So much of the testimony of this witness as relates to claims four and six of the Olin patent is objected to in view of the following letter from Messrs. Banning & Banning, counsel for complainant, the original of which is quoted from and will be produced in court:

155 CHICAGO, *June* 15, 1885.

Messrs. Dyrenforth & Dyrenforth, present.

GENTLEMEN: In the last bill filed by Mr. Deering against the Winona Harvester Works *et al.* the complainant will rely upon and claim infringement of the following claims, but no others, to wit:

Patent No. 191,264, claim 5.
Patent No. 223,812, claims 1, 2, and 3.
Patent No. 251,147, all the claims.
Patent No. 266,913, claim 21.
Patent No. 272,598, claims 20 and 21.

Yours, etc., BANNING & BANNING.

(Stenographic.)

Counsel for complainant states that the letter above quoted is from them and was written a few days after the bill was filed in response to inquiries from defendant's counsel as to the various claims in the five patents included in the bill, which contained in all 58 claims, the complainant should rely on, and was written in the absence of Mr. Deering or Mr. Steward or Mr. Bates or any other persons who was conversant with the harvesters and binders or capable of speaking as an expert in relation to the construction and operation of such machinery and in the absence of any of defendant's machines, one of which has been present during the taking of this deposition, or any model of the same; that such letter was written in a measure off-hand and to save defendant's counsel the necessity of moving the court to have the complainant particularly point out

the claims that he intended to rely upon and without any thought or purpose of in any way causing the defendant to make a less thorough and perfect defense than he otherwise would have
156 made, and that defendant's counsel in the amendment to their answer which they have stated that they expected shortly to make can include any further defenses *with* a further examination may disclose or enable them to make which particularly relate to the fourth and sixth or other claims of the Olin patent No. 223,812, not mentioned in the letter quoted, but *but* which have been mentioned by the witness as being infringed, and complainant's counsel state that upon a study of said Olin's patent with defendant's machine before them they are clearly of the opinion that the fourth, fifth, and sixth claims of said Olin patent are infringed in defendant's machine, and that they shall so insist from this time forward and upon hearing of this cause.

By Mr. DYRENFORTH: Soon after the second bill was filed by Deering I informed counsel for complainant that, owing to the extraordinary number of claims in the five patents sued on, I should demand a specification of the particular claims of which infringement was charged, and that, unless this specification should be given voluntarily, I should move in court either for a rule upon complainant to specify the claims relied upon or for privilege of making the necessary examination into the state of the art and answering the bill after the complainant had taken testimony to make out his *prima facie* case of infringement. Counsel for complainant replied that they would consider the matter and consult with their clients. A few days after this conversation the letter above quoted was handed to me, and the subsequent search into the state of the art was governed by the statements which the letter contained. It is now too late for counsel for complainant to retract the definite statements contained in their letter. So much of the statement of counsel for complainant as relates to the fifth claim is objected *as to* having been made in the hearing of
157 witness now upon the stand. Counsel for complainant has mentioned Mr. Steward. Up to the present time Mr. Steward has not appeared in this record, and I request counsel for complainant to state who he is, what he has to do with this suit, and whether he is the same Mr. Steward that figures as the patentee of several of the patents sued on.

Counsel for complainant stated that Mr. Steward is the patentee of three (3) of the letters patent sued on, and that he is in the employ of the complainant and particularly in charge of all of his patent matters. If at any time Mr. Steward should appear as a witness or in any other capacity he trusts that the above statement of his position may not be considered as binding, so that he cannot "retract" or modify it.

By Mr. DYRENFORTH: It is unfortunate for you that your letter letter did not contain a similar saving clause.

158 X Q. 322. Now, turning to the Steward patent No. 272,598, of February 20th, 1882, suppose the adjustable frame carrying the butt-apron in the Winona machine were provided simply

with a board extension rigidly secured to it so that its angle would always concide with that of the butt-apron, which clause, if any, of the above-named patent would that construction infringe?

A. Within narrow limits of adjustment such a board would perform all the functions of Steward's board $d^1$ and in the same way. Beyond those limits it would render the machine inoperative. The adjustment, however, beyond those limits might be effected by moving the entire platform and binding mechanism, just as is now done when it is desired to make an adjustment beyond the capacity of the butting apron. Therefore such a construction, if it infringed any claim of the patent, would infringe the twentieth (20) claim. In my opinion such construction would, within the operative limits, contain the combination of said 20th claim.

X Q. 323. Suppose the board connection were pivotally connected to the lower end of the adjustable frame carrying the butt-apron and were provided with fastening devices for securing it in a position parallel or nearly so with the edge of the deck, whatever the angle of the frame carrying the butt-apron, the fastening devices comprising, for example, pegs to ente*d* holes provided at intervals in the deck, which claim, if any, of the patent — question would be infringed by that construction?

A. The 20th.

X Q. 324. What is the function of the board extension upon the butt-adjuster?

159 A. It is to prevent the grain which goes to form the gavel from working or jarring forward, thus making an unsightly and uneven bundle.

X Q. 325. Is it essential that the board should be maintained parallel to the edge of the deck?

A. It should be substantially at right angles with the gavel. The edge of the deck is generally in that position, and therefore it should be substantially parallel with the edge of the deck.

X Q. 326. Is it not a fact that in the Winona machine the pivoted end of the board extension is socketed to a horizontal rod *but* down near its end to accommodate it to the butt-adjuster, and that this rod is moved longitudinally by means of a lever extending from the opposite end of the rod to within convenient reach of the driver, and that the board is maintained in a position substantially parallel with the edge of the deck by reason of the lateral socket which received the rod?

A. Yes, sir.

X Q. 327. Do you find in the Steward patent a top or ridge to the machine, the same as in the Winona machine?

A. Yes, sir.

X Q. 328. Then in the Steward patent the part referred to as $d^3$ is in a- oblique strip distinct from the top ridge, is it not?

A. Yes; it is a separate piece. In the Winona machine the part corresponding to Steward's $d^3$ is not formed entirely of the ridge, but of the ridge together with the other pieces.

X Q. 329. Does Steward's 21st claim in the patent No. 272,598

cover every possible mechanism that might be employed for
160 permitting the driver to shift the angle of the butt-adjuster and at the same time maintain the butt-board in position substantially at right angles with the grain?

A. No, sir; not as I understand it.

X Q. 330. What function does the top or ridge of the machine perform in the Winona machine as one of the sides of the parallelogram to which you have referred?

A. It is the fixed side of the parallelogram, and as such determines the direction of its opposite, and consequently of the butt-board. If one side were not fixed with reference to the main body of the machine, the parallelogram would be inoperative as a means of preserving the parallelogram of the butt-board.

X Q. 331. What function does the piece $d^3$ perform in the Steward device?

A. The same function as the ridge in the Winona. It is the fixed member of the parallelogram.

X Q. 332. Then what function does the ridge or top of the machine perform in the Steward device?

A. No particular function with respect to this combination. It is simply a part of the frame of the machine and nothing more.

X Q. 333. Then it follows that except so far as it is equivalent of the piece $d^3$ in the Steward device it performs no function as an element of the combination in the Winona machine either, does it not?

A. That is true.

X Q. 334. Now, suppose the top ridge in the Winona machine were wholly omitted, what effect would this have upon the operation of the butt-adjusting device in that machine?

A. The butt-adjusted would operate exactly the same upon the grain, and as for the operation of the butt-board it is immaterial whether you have a ridge pole to form the fixed member of the parallelogram or not. The fixed side is an imaginary line,
161 and it makes no difference whether it goes through space or through matter, provided that its ends where the pivots are are fixed with respect to the main body of the machine.

X Q. 335. Are there any other imaginary elements in the Winona machine which go to make up the Steward combination set forth in claim 21 of patent No. 272,598?

A. My last answer means in substance that the side of the parallelogram may be straight or crooked, and its function and mode of operation will be exactly the same. The same remarks apply equally as well to the other sides as to the fixed side.

X Q. 336. What kind of a lever is the lever which is employed in the Winona machine to move the horizontal rod which operates the butt-adjuster and butt-board?

A. It is one with the fulcrum between the power and the resistance.

X Q. 337. That is to say, it is a lever of the first class, is it not?

A. Yes, sir.

X Q. 338. Suppose that the bar in the *which* Winona machine

to which the horizontal rod is connected by eyes were provided with an extension at right angles about in line with the lever, and the lever were prolonged at its power end and pivoted to this arm below the rod, and the catch mechanism for the lever were placed, say, upon the bar along which the rod moves instead of upon the top or ridge of the machine, what kind of a lever would be employed in that case for operating the butt-adjuster and butt-board?

A. That would be one in which the resistance would be between the fulcrum and the power; in other words, a lever of the second class.

162 X Q. 339. Would the construction I defined in my last question, in your opinion, infringe the 21st claim of the Steward patent No. 272,598?

A. For the reason that there would be no parallelogram which would preserve the parallelism of the butt-board it would not.

X Q. 340. Now, please state whether you can see any reason why the construction which I defined in X Q. 338 would not operate the butt-adjuster and butt-board just as effectively as the construction employed at present in the Winona machine.

A. With the aid of the other device in the Winona machine I should think it would, and I don't see why the machine was not made that way instead of being made in accordance with Steward's claims.

X Q. 341. In the Winona machine is not the sole function of the lever to afford the driver convenient means for imparting longitudinal movement to the horizontal rod for the purpose of moving the butt-adjuster and butt-board?

A. I think not. It forms part of the parallelogram for guiding the butt-board. This is apparent when the eyes through which the bent rod passes are removed, especially if a straight rod be substituted for the bent one. With the bent rod the eyes are desirable to hold the bent upright, as without them it would fall over and disturb the position of the butt-board.

X Q. 342. Is it essential in the device as used in the Winona machine that the parallelogram to which you refer should be preserved?

A. It might be dispensed with, but if it were the butt-board and adjuster would be out of reach of the driver and useless.

163 X Q. 343. Would that be the case if the other form of lever which I defined in X Q. 338 were employed?

A. No.

X Q. 344. Then, if the construction which I defined in X Q. 338 would, as you say, operate just as effectively as the one at present employed in the Winona machine, why is the feature of the parallelogram an essential one to the device in the Winona machine?

A. It is necessary to have something to preserve the parallelism of the butt-board. You can use Steward's invention or some other mechanism. The Winona parties have chosen to use Steward's invention. It was not essential, for they might have used something else.

X Q. 345. Now, Mr. Bates, is it not a fact that in Winona device

that which preserves the parallelism of the butt-board, or, in other words, causes the butt-board in its movements always to maintain a position substantially at right angles with the grain, is the horizontal rod and horizontal socket on the upper end of the butt-board which the rod enters, irrespective of the particular agent which may be employed for moving the rod back and forth and irrespective of any question of parallelograms, real or imaginary?

A. Certainly; but the parallelogram is necessary to preserve the parallelism of the rod. The butt-board follows the rod, of course, just as in Steward's patent it follows the piece $d^2$, to which it is secured.

X Q. 346. Does the Steward patent show a horizontal sliding rod entering a horizontal socket in the upper end of the butt-board, together with some sort of a convenient lever to enable the driver to slide the rod back and forth?

A. No, sir.

164 Redirect examination by Mr. BANNING:

R. D. Q. 396–11. Look at the fifth claim of the Olin patent No. 223,812, sued on, and compare the combinations and devices therein described and claimed with the mechanism of the Winona binder offered, and state whether or not, in your opinion, the said Winona binder contains the combinations or devices described and claimed in said fifth claim, giving your reasons for any opinion you may express.

By Mr. DYRENFORTH: The question is objected to as incompetent, irrelevant, and immaterial in view of the letter from counsel for complainant to counsel for defendants quoted at length in an earlier part of the present deposition.

Counsel for complainants state, as they have before done, that, owing to such letter and the desire they have that defendant's counsel shall not be put to any disadvantage owing to any surprise that might be occasioned to them by reliance upon the claims not mentioned in said letter, they will consent, and hereby express such consent, that defendant's counsel may have a reasonable time to make investigation as to such claims and may amend their answer so far as may be necessary to include therein defenses against the claims not enumerated in said letter.

By Mr. DYRENFORTH: We decline to accept your offer as a consideration for releasing you from your promise. If we decide to amend our answer to include additional claims of the Olin patent it will be done without waiver of any rights which your letter has secured to us.

A. The defendant's machine contains the invention set forth in the Olin patent and claimed in the fifth claim thereof for the following reasons:

165 Said invention relates more particularly to the mechanism for driving the butt-adjuster. As defined in the claim it is a combination of the following elements: The shaft W, which

receives motion from the mechanism of the harvester; the wheel *h*, which is a beveled gear mounted on the shaft W; the gear wheel *g*, which is a beveled gear mounted on the butt-adjuster frame and meshing with the wheel *h*; the pulley wheel *d*, which forms the driving pulley for the butt-adjuster belt & is secured to the wheel *g* so as to move with it; the frame I, which connects the wheels *g* and *h* and keeps them constantly in gear.

As shown and described in the Olin patent, this mechanism is applied to the swinging end of the butt-adjuster, but the patent states that it may be applied to the other end, namely, the pivoted end. As shown and described, the frame is *is* so formed as to have two arms parallel to each other and a connecting piece; in other words, in the shape of a V. The wheel *h* is between the two arms of the frame *i*, so that, whichever way the butt-adjuster swings, the wheel *h* will go with it. Obviously, if this mechanism be located at the pivoted end of the butt-adjuster, it will be unnecessary to have two arms embracing the wheel *h*, and the construction of frame *i* may be simplified and cheapened by omitting one of said arms. The truth of this will be apparent when we turn to the defendant's machine. In the defendant's machine the mechanism for operating the butt-adjuster is applied to the pivoted end. This mechanism consists of certain instrumentalities, to wit:

A shaft corresponding to Olin's shaft, W, extending across the harvester and receiving motion from the main gearing of the harvester.

166 This shaft, like Olin's, also carries the upper roller of the main elevator butt of the machine, a bevel-gear wheel mounted on the shaft, another bevel gear mounted on the butt-adjuster frame and meshing with the first-mentioned gear, a pulley wheel which forms the driving pulley of the butt-adjuster belt connected to the last-mentioned bevel gear so as to move with it, a frame which connects the two bevel wheels, or rather their shafts, and keeps them constantly in gear. These parts, except the frame, are all just like the analogous parts of the Olin mechanism, and the frame differs from Olin's only in the omission of one of the arms, which is rendered unnecessary by reason of the mechanism being applied to the pivoted instead of the swinging end of the butt-adjuster.

These parts are all combined together and operate in the same way and perform the same function in the defendant's machine as in the Olin patent, and the result secured is the same.

For these reasons, namely, that the defendant's machine contains all the elements of Olin's fifth claim and in exactly the same combinations, I say it contains Olin's invention as defined in said fifth claim.

Cross-examination by Mr. DYRENFORTH:

Without waiving any of the objections heretofore entered upon the record to questions relating to the claim of the Olin patent *exempt* in letter of counsel dated June 15, 1885, and heretofore quoted at length in record.

X Q. 397–184. Please quote from the Olin specification the portion which says a combination set forth in the fifth claim may be employed in the pivoted end of the device.

167 A. As shown, the frame or support for the elevator or belt Q is pivoted at the lower end of the elevator frame and has its driving mechanism located at the upper end, but the driving mechanism may be located at the lower end of the belt Q or elevator, if desired.

X Q. 398–185. If the butt-adjuster were thus reversed would it be necessary that the driving mechanism should perform all the functions of that shown in the drawings of the Olin patent?

A. So far as I perceive, it would.

X Q. 399–186. Do you notice that in the body of the specification the frame *i*, which forms an element of the combination of the fifth claim, is referred to as the sliding head *i*?

A. Yes, sir.

X Q. 400–187. Is there any sliding head corresponding to the frame *i* in the actuating mechanism of the butt-adjuster in the defendant's machine?

A. There is a device corresponding to the frame *i*, but it does not slide, and therefore is not a sliding head. Olin's would not be one either if located at the other end of the butt-adjuster, as he suggested may be.

X Q. 401–188. Is it necessary in the Olin device as presented in the drawing of his patent that the head *i* should be a sliding head?

A. No; for with the device located at the swinging end of the butt-adjuster the shaft W might be made to slide, and with the device located at the pivoted end it is unnecessary to have any sliding motion at all.

X Q. 402–189. Is not the driving mechanism for the butt-adjuster as shown and described in the Olin patent contrived

168 with an especial view to adapting it to the swinging end of the adjuster?

A. It may be. It is equally adapted to either end.

X Q. 403–190. Is it not a fact that if transposed to the pivoted end of the butt-adjuster some of the elements of the driving mechanism shown and described in the Olin patent would become inactive and be mere useless additions?

A. I think not. If that were the case surely the defendants would not have used them all in the defendant's machine.

X Q. 404–191. If transposed to the pivoted end would the sliding head *i* slide?

A. No; but it would be the same device nevertheless.

X Q. 405–192. Then would not the sliding feature become in that event a mere useless addition?

A. The sliding feature would be, of course, unnecessary.

X Q. 406–193. As I understand you, the driving mechanism for the butt-adjuster of the Olin patent may without change be applied either to the swinging or pivoted end of the butt-adjuster and be operative in either situation, though when applied to the pivoted

end some features of the construction would not come into action. Am I correct?

A. The first part of your statement is correct. As to the second, none of the features which are mentioned in the fifth claim as material to the combination would be inactive. I do not call the capacity for sliding a material feature of the construction, and if it were it might still exist in the head *i* when at the pivoted end, though the sliding would be prevented by the pivot of the butt-adjuster engaging the main frame of the machine.

169 X Q. 407–194. Is not the sliding capacity of the head or frame *i* an essential feature of the driving mechanism for the butt-adjuster as represented in the drawings of the Olin patent?

A. I have already stated that it was not. The shaft W might be made to slide instead of the head *i*.

X Q. 408–195. But my last question expressly excludes a sliding action on the part of the shaft W, for it refers to the device as represented in the drawings of the Olin patent. Please answer the last question with that understanding.

A. The drawings represent the device as capable of sliding, and, of course, in order to be a sliding device it must slide.

X Q. 409–196. Suppose that the device in the defendant's machine for supporting and driving the butt-adjuster were substituted bodily for the supporting and driving mechanism of Olin's butt-adjuster as represented in the drawings of his patent, how would the device work?

A. It would work in the same way, so far as I can see.

X Q. 410–197. In the same way as what?

A. In the same way as Olin's combination and in the same way that it works in the defendant's machine.

X Q. 411–198. Would any sliding movement be provided for?

A. It would be capable of sliding.

X Q. 412–199. How would it be capable of sliding if introduced into the Olin machine as that machine is represented in the drawings of the patent?

A. The frame which connects the two gears would slide upon the shaft just as Olin's frame does.

170 X Q. 413–200. Does not the device as represented in the defendant's machine consist of a bearing to support the pulley to be driven and the beveled gear wheel on the end of that pulley, the bearing being provided with flanges, whereby it may be firmly bolted to the side of the machine at its upper end?

A. Yes, sir.

X Q. 414–201. And are not the flanges upon the bearing disposed with a view of obtaining as high degree of rigidity as possible when the bearing is bolted in place?

A. I presume they are. They ought to be.

X Q. 415–202. Was it new or old in machinery prior to the date of the Olin patent to drive a pulley by means of beveled gearing?

A. Old.

X Q. 416–203. Was it new or old in machinery prior to Olin's application for the patent under consideration to mount a pulley

in a fixed bearing and drive it by means of beveled gearing, one pinion of the gearing being upon the shaft of the pulley outside the bearing, and the other beveled pinion being upon the driving shaft at right angles to the pulley?

A. Old.

X Q. 416–204. Then, the fifth claim of the Olin patent could not well be held to cover the construction defined in my last question, could it?

A. Hardly, especially as it isn't claimed.

X Q. 417–205. Please define the features of construction in the defendant's machine which, in your opinion, infringe the fifth claim of the Olin patent.

171 A. The frame of the butt-adjuster, the butt-adjuster belt, the round bar connected to the swinging end of the butt-adjuster by means of the socket on the butt-board, and the lever by which the driver operates upon said driving rod to adjust the end of the belt.

X Q. 419–206. Prior to the time of Olin's application was it old in mechanics to have a board or arm hinged at one end and adjusted to different angles by means of a sliding rod connected to it toward its free end, the sliding rod being operated by a lever?

A. It might have been. I don't recall any instance just now.

X Q. 420–207. Now, define again, if you please, the features of the defendant's machine which, in your opinion, infringe the fifth claim of the Olin patent.

A. The butt-adjuster, the mechanism which elevates the grain from the receiving level to the binding level, and the piece of sheet iron with the word defendant's on it, which holds the grain down to the action of the elevating or conveying mechanism and the butt-adjuster.

X Q. 421–208. Is the entire function of the sheet-iron cover in the defendant's machine performed by the board R in the Olin device?

A. Yes; by the board R and the fingers S′. The sheet iron in the defendant's machine prevents the grain being shot out of the machine at the top of the *u*ncline, and that is done in the Olin by the continuation of the board formed by the fingers S′. I see no other difference between them.

X Q. 422–209. Suppose that no butt-adjuster were employed in the defendant's machine, would the sheet-iron cover still be an essential feature of the machine?

172 A. Yes; so would the board R in the Olin under the same conditions.

X Q. 423–210. Why would the board R *h*e an essential element of the Olin machine if the butt-adjuster were omitted?

A. Because w*i*thout it the grain would get away from the conveying belts.

X Q. 424–211. Would not the fingers S′ prevent that?

A. If they were there they would take the place of the board R and be the equivalent of it.

X Q. 425–212. Are they not there?

A. They are. The last two or three answers were given with the idea that the cover R extended farther across the conveyor than it appears to in figure 3. Of course, if the board is so narrow as to act upon the grain only in the immediate vicinity of the butt-adjuster, it might be dispensed with if the butt-adjuster were moved, provided, of course, that there were a finger S′ near enough to the butts to hold them down properly. There appears to be such a finger in figure 3.

X Q. 426–213. Have you ever seen an elevator of the kind represented in the Olin patent?

A. Yes, sir.

X Q. 427–214. What was the width of the elevator belts in the device or devices of that class which you saw?

A. I don't remember; probably a few inches.

X Q. 428–215. Were they more than an inch and a half or two inches in width?

A. Probably not.

173 X Q. 429–216. What would you judge to be the width of the elevator belts M of the Olin machine?

A. According to the proportions of the drawings, about two inches.

X Q. 430–217. Is the elevator belt Q about the same width?

A. A little more; probably near three and a half or four, according to figure 2.

X Q. 431–218. Is the scale of figure 2 different from the scale of figure 1?

A. In the main it is not, but the belt Q is shown narrower in figure 1.

X Q. 432–219. What is the width of the elevator belt Q as shown in figure 1?

A. The same as belt M, about two inches.

X Q. 433–220. How wide is the space between the upper edge of the belt Q and the board R?

A. About the same as the width of the belt.

X Q. 434–221. How wide is the apron of the butt-adjuster in the defendant's machine?

A. Ten inches.

X Q. 435–222. Now, suppose a belt or chain two inches in width were substituted for the butt apron in the defendant's machine, how would the device work?

A. It would not work quite so well as an evener, because it would be necessary to lower the sheet-iron boards some, and that would confine the swath; but for delivering the grain centrally to the binder it would work just as well.

174 & 175 X Q. 436–223. Then you think a belt or chain two inches in width would be a practical device in the situation of the butt apron in the defendant's machine, do you?

A. Yes, sir.

X Q. 437–224. Could the butt-adjuster of the defendant's machine as used in that machine—that is, over the deck on the binding side—be employed in a machine which elevated the grain by means

of an elevator of the character represented in the drawings of the Olin patent?

A. I think it could.

176 Circuit Court of the United States, District of Minnesota.

WILLIAM DEERING
*vs.*
THE WINONA HARVESTING WORKS *et al.* } In Equity.

Depositions taken on the part of the complainant, at the office of Banning, 60, 204 Dearborn St., Chicago, Ill., by agreement of parties, this 20th day of April, 1888, before Geo. S. Payson, a notary public in and for Cook county, Ill.

Present: Thos. A. Banning, counsel for complainant, and P. C. Dyrenforth, counsel for defendants.

GOTTHILF SCHLESENER, a witness produced, sworn, and examined on the part of the complainant, in answer to questions proposed by Mr. BANNING, deposes and testifies as follows:

Q. 1. I believe you have been examined as a witness once before in this case, have you not?

A. Yes.

Q. 2. At what place in Kansas is your home?

A. Dickerson county, Union township.

177 Q. 3. You are acquainted with Gottlieb Heller of your county?

A. Yes.

Q. 4. How long have you known him?

A. I have known him since about 1875; since he came to Kansas.

Q. 5. Look at this device now shown you marked "Defendants' Exhibit Heller Butt-adjuster, with Adjustable Extension." Look at both parts marked 1 and 2 and state whether or not these parts were shown you at the time you gave your testimony before?

A. No, I did not see them.

Q. 6. I believe that testimony was given in May, 1887, was it not?

A. It was last year. I am not certain about the month.

Q. 7. And you say that when you gave your evidence last year this device, now shown you, was not shown at that time?

A. No, I never saw it, so long as I got the machine on my place.

Q. 8. You mean that you never saw it since it was on your machine until recently, is that correct?

(Objected to as leading.)

A. No, I never saw it, since.

Q. 9. Look at this Exhibit Heller Butt-adjuster with Adjustable Extension, and state who made it, if you know?

A. I and Heller, we both made it.

Q. 10. Which part did you and Heller make?

A. We made this iron piece.

Q. 11. What did you do — it when you made it?

A. We put it on the wooden piece.

Q. 12. Do you mean this wooden piece, marked, "Heller Butt-adjuster with Adjuster Extension," part 1, here before you?

A. Yes we put it on that piece.

Q. 13. What year was it that you and Heller did this?

A. 1880.

Q. 14. What did you make this iron piece, marked "Defendants' Exhibit Heller Butt-adjuster with Adjuster Extension, part 2," out of?

A. I had an old Triumph self-rake, and we cut it out from a piece of iron from the self-rake.

Q. 15. You say you cut this piece out of a piece of iron that was on your old Triumph self-rake, is that correct?

A. Yes, that is correct.

178 Q. 16. What was the piece of iron used for on the old Triumph self-rake?

A. It was at one side of the platform to protect the gearing from the grain.

Q. 17. How did it stand on the old Triumph machine?

A. It stood up on its edge.

Q. 18. Look at this other piece that I show you, and state, if you can what it came off of?

A. It is the same kind of an iron from another machine.

Q. 19. Coming back now to this iron piece which you and Heller made in 1880, you say you fastened it to this wooden part of the butt-adjuster marked No. 1, is that correct?

A. That is correct.

Q. 20. How did you and Heller fasten this iron piece to the wooden piece?

A. We put it on with a bolt here (pointing to hole mark- X in the wooden piece) and I believe we had a screw behind (pointing to the hole marked XI.)

Q. 21. This iron piece has a bar, rivetted to it along one side and bent at one end at an angle of about 45°. How was that bar at the time you and Heller made it and put it onto the wooden part here marked part 1?

A. It was straight.

Q. 22. How are you able to say that these two pieces before you, the iron piece and the wooden piece forming this Exhibit Heller Butt-adjuster with Adjustable Extension are the ones which you and Heller made in 1880?

A. I know the wooden part by this cloth on one of the rollers and the belt on the same roller. I know this iron piece because I cut it out, Heller and I, he held it to the machine, or one of us, and the other marked where to cut; we cut it with a cold-chisel.

Q. 23. Here is another bend in the bar rivetted to this iron, not quite half way from the angle, mentioned awhile ago, and the other end, do you recognize that bend?

A. Yes that is the bend I put in myself.

Q. 24. When did you put in this bend that we are talking about?

A. In 1880.

Q. 25. Why did you put in this bend?

A. This end (pointing to the smaller end of the iron piece) came too close to the butts of the grain, and I bent it back some.

Q. 26. You say you did that in 1880?

A. Yes.

179 Q. 27. These holes in the end of the bar on the iron piece do not correspond to the holes X and XI in the wood, what have you to say about that?

A. The bar has been cut off.

Q. 28. Do you mean that it used to be longer?

A. Yes, I think it used to be longer—it was longer.

Q. 29. Do I understand you to say that this bar extended out and had another hole in it at the time you and Heller fastened it onto the wooden part in 1880?

(Objected to as leading.)

A. Yes, sir.

Q. 30. Did the bar have this hole, which now appears in it between the end hole in the bar and the sheet iron at the time you and Heller put it on the wood part in 1880?

A. I think not, I think that hole was made afterwards.

Q. 31. Look at the end of this bar and see whether it has been cut off with a cold-chisel.

A. I think it has been cut off.

Q. 32. At the time that you and Heller put this iron piece on the wood piece in 1880, was the iron piece pivotted to the wooden piece or rigidly fastened to it?

(Objected to as leading.)

A. I don't know what that means.

Q. 33. Was it fastened stiff or loose?

A. It was fast.

Q. 34. Do you mean that it was stiff with the wooden piece?

A. Yes.

Q. 35. This bar, on the iron piece, you say was straight?

A. Yes.

Q. 36. And fastened to the upper side of the wooden piece by these holes X and XI?

A. Yes; that is correct, we had something under at the hole X to keep the iron from coming too close to the roller.

Q. 37. And the iron part and the wooden part would move together, so that they would be the same angle?

A. Yes, sir.

Q. 38. What machine was it that you and Heller used this buttboard and extension now before us on?

A. A Beloit binder.

Q. 39. I believe that was a Parker and Stone machine.

A. I couldn't tell the name, we called it Beloit.

Q. 40. When did you buy that Beloit machine?

A. 1879.

Q. 41. Who did you buy it of?

A. From Gottlieb Heller—no, no, from Rubins.

Q. 42. At what place?

A. In Dickinson county.

180 Q. 43. Was he agent for the Beloit machine?

A. Yes, sir.

Q. 43. How did Mr. Heller come to help you make this butt-adjuster extension from your old Triumph machine and put it on your Beloit machine?

A. In 1880 Heller was agent for the Beloit machine and he came around to see and examine the machines.

Q. 44. After you and Gottlieb Heller made this iron extension and fastened it onto this wooden butt-adjuster, how long did you use it?

A. We used it in 1880 and '81.

Q. 45. How long did this wooden butt-adjuster and this iron extension marked, "Heller butt-adjuster, with adjustable extension" remain in your possession? How long did you keep it?

A. Two years.

Q. 46. How long did you keep the machine?

A. I kept the machine three years, and two years with this iron on.

Q. 47. I am not asking you how long you used the machine or how long you used this iron, but I want to know when this iron was taken away from your place.

A. It was in 1882, in the spring, before harvest.

Q. 48. Was the machine taken away at the same time?

A. The harvester went away one day and the binder the next.

Q. 49. And this butt-adjuster with the iron extension was on the binder?

A. It had to be taken off the machine when the binder was taken off.

Q. 50. Was this butt-adjuster with its iron extension taken away from your place when the binder was taken away?

A. Yes, sir.

Q. 51. Was this iron extension on the butt-adjuster when they were taken away?

A. Yes, sir.

Q. 52. At the time they were taken away how was it fastened onto the butt-adjuster?

A. I think it was fastened on by a bolt and a screw. I did not remember for sure that it was on, but I went with this man (pointing to Mr. Whitney) over to the next man who got the machine and he told me it was on when he took the machine away.

The answer of the witness is objected to as hearsay.

181 Q. 53. Who was the man that got the machine from you together with the binder and the butt-adjuster?

A. Mr. Richard Messing.

Q. 54. And he told you that the iron extension was still on the butt-adjuster when he got the machine of you?

(Objected to as calling for hearsay.)

A. Yes, sir.

Q. 55. Is that the way you remember it also?

A. I think it was on.

Q. 56. Had you ever taken this iron extension off of the butt-adjuster after you and Heller put it on?

A. I can't tell for sure whether I took it off once; I had long grain once and may have taken it off.

Q. 57. You say Mr. Messing got the machine and binder with this butt-adjuster and iron extension from you in the spring of 1882?

A. Yes, sir.

Q. 59. From the time he got the machine from you have you seen this butt-adjuster with iron extension until recently?

A. No.

Q. 60. Did you help Mr. Messing start the machine on his farm?

A. Yes, I did that.

Q. 61. That was, how long after he got the machine of you?

A. About a week or so.

Q. 62. Did it have this butt-adjuster and this iron extension on it when you helped him start it?

A. I couldn't tell for sure whether it was on or not, he says it was on.

The last part of the answer is objected to as hearsay.

Q. 63. I believe, in your testimony given last year, you said that you and Heller put this iron extension on the butt-board in 1879?

A. That was a mistake.

Q. 64. How are you able to fix the date as 1880, when you put this iron extension on the butt-board?

A. I have got a boy who was born in 1878, and my brother cut my grain with his McCormick harvester in that year; the next year I bought the Beloit machine from Rubins, and the next year when Heller was agent I put this extension on.

Q. 65. Have you still any of the parts of your old Triumph reaper about your place?

A. Lots of parts of it.

182 Q. 67. Is this the only iron extension that you ever helped Heller to put onto a butt-board?

A. Yes, sir, that is the only one.

Q. 68. Who bored this hole, marked X?

A. I couldn't tell whether I made it or Heller.

Q. 68. One of you made it at the time you fastened the iron extension on?

A. That is right.

Q. 69. Here is another hole in this wooden butt-adjuster XII, with a short bolt through it; who made that hole and put in that bolt?

A. I couldn't tell that?

Q. 70. Was it done while the machine was at your place?

A. No, it was not.

Q. 71. And on the other side opposite this hole, marked XII is a screw and washer, who put them there?

A. I don't know.

Q. 72. Were they put there while the machine was at your place?

A. No.

Q. 73. At this roller which has a piece of cloth tacked around it is a rubber belt, which you say you put on?

A. Yes, I put it on.

Q. 74. Where did you get this piece of rubber?

A. I bought that in Abilene.

Q. 75. When did you buy it?

A. I don't know what year I bought it, whether it was in '80 or '81.

Q. 75. How do you know that this is the piece of belt which you put on?

A. I know it by the holes and string where the ends are sewed together.

Q. 76. What was the old belt where this one now is?

A. I couldn't tell, it was a black belt, either leather or rubber.

Q. 77. How do you know that this piece of cloth tacked on this roller is the piece of cloth which you put on?

A. I know it from that color, (pointing to the little streaks.)

Q. 78. What did you use to make this piece of cloth tacked onto this roller?

A. I cut it out of a piece of clothing. I put it on to keep the canvas from slipping around that roller.

Q. 79. Was this bend of about 45° at the end of the iron bar on this sheet-iron piece made while the machine was at your place or afterwards?

A. Afterwards; after it left my place.

183 Q. 80. In your evidence last year you said that the extension which was bolted onto the butt-adjuster had only one bolt while you have explained this morning that the extension was fastened by a bolt and a screw. At the time you gave that testimony you have said that the parts were not shown you?

A. No, I never saw them then.

Q. 81. You also said when you gave your evidence last year that this iron arm or bar was bent. Here are two bends in this iron bar before you, which bend did you mean when you gave your evidence last year?

A. I meant this bend (pointing to the one between the bend of 45 and the end of the bar.)

Q. 82. You also in that same connection said that it was bent "to adapt it to the curvature of the surface of the deck so as to fill out the hole in the deck." Which curve or bend did you have reference to when you said it was to fit the curvature of the surface of the deck?

A. The bottom curve on the piece of sheet iron where it is cut with the cold-chisel.

Q. 83. You are sure that this butt-adjuster and this iron exten-

sion are the very same ones that you and Heller put on your Beloit machine in 1880?

A. Yes, sir, I am sure.

Cross-examination by Mr. DYRENFORTH:

X Q. 84. How long have you been acquainted with Mr. Whitney, the gentleman present, to whom you referred in your direct examination?

A. The first time that I saw him was when he came out to see me.

X Q. 85. When was that?

A. Since the week before last.

X Q. 86. Have you a farm in Dickinson county, Kansas?

A. Yes, sir.

X Q. 87. Did Mr. Whitney go to see you week before last at your farm?

A. Yes.

X Q. 88. Did he tell you that he had testified in this case as an expert for Mr. Deering?

A. No, sir, he didn't tell me that.

Counsel for defendant asks counsel for complainant whether he will state on the record that the Mr. Whitney referred to is the same Mr. Whitney that has heretofore testified on behalf of complainant.

184 Counsel for complainant replies that the Mr. Whitney referred to by the witness is the same Mr. Whitney who has heretofore testified as an expert on the part of the complainant.

X Q. 89. When Mr. Whitney went to see you, did he have with him the Exhibit Butt-adjuster with Adjustable Extension, concerning which you have been testifying?

A. Yes, he had it with him and showed it to me.

X Q. 90. Is not the wooden part of that exhibit the same in form as the butt-adjusters on all the old Beloit binders?

A. Yes, on all that I saw that were made at that time.

X Q. 91. Who else besides you had a Beloit binder before 1880, that you know of?

A. A neighbor of mine, Watson, got one in 1878.

X Q. 92. Did not Gottlieb Heller have one?

A. Yes, sir.

X Q. 93. When did he get his, if you know?

A. He got his in 1878, the year before I got mine.

X Q. 94. Who was with you when you put cloth on the upper roller of your butt-adjuster?

A. I put it on myself, at my house before I started the machine.

X Q. 95. Who gave you the idea of doing so?

A. I thought of it myself.

X Q. 96. And you don't know, do you, whether any other farmers had put cloth on the rollers of their butt-adjusters to increase the friction?

A. Yes, lots of them got it on; some had it on and some did not.

X Q. 97. I understand you to say that you bought that rubber belt at Abilene, is that correct?

A. Yes.

X Q. 98. How far is Abilene from your farm?

A. About 18 or 20 miles.

X Q. 99. Abilene is the nearest large town to your farm, is it not?

A. Yes.

X Q. 100. And the farmers around in your neighborhood go to Abilene a great deal to make purchases, don't they?

A. At that time they did.

X Q. 101. Was the belting that you bought for sale openly in a store in Abilene?

A. Yes; a big roll of it.

X Q. 102. Was there any other store in Abilene, at that time, that sold belting?

A. Oh, yes.

185 X Q. 103. Do you know whether any other stores there had belting, at that time, of the same kind?

A. I did not try other places and do not know whether they had or not.

X Q. 104. That rubber belting on that butt-adjuster is of a very common kind, is it not?

A. Yes.

X Q. 105. And farmers have to buy belting occasionally to repair their harvesting machinery, don't they?

A. Yes.

X Q. 106. If any other farmer in your neighborhood had gone to Abilene at about that time to get a new belt for his butt-adjuster he would probably have got the same kind of a belt that you got would he not?

A. I don't know.

X Q. 107. If he had gone to the same store he probably would, would he not?

A. Yes, of course he would.

X Q. 108. You did not see that butt-adjuster and extension for six years until the week before last?

A. No, I never saw it during that time.

X Q. 109. You are well acquainted with Mr. Heller, are you not?

A. Yes.

X Q. 110. Do you consider Mr. Heller an honest man?

A. I think he is.

X Q. 111. Mr. Heller is a religious and good man, is he not?

A. Yes, I think he is.

X Q. 112. If Mr. Heller testified to anything under oath, you would believe that he thought he was right, would you not?

A. If he didn't think he was right he wouldn't do it.

X Q. 113. Now, Mr. Heller looked at that butt-adjuster and extension and swore that he believed it to be the same one that he made for his machine in 1878, and he said that he cut the sheet-

iron piece from an old Kirby rake; now you think, don't you, that Mr. Heller was mistaken?

A. Yes, I think he was mistaken in that.

X Q. 114. You think, do you not, that that is not the sheet-iron piece that Mr. Heller cut from the Kirby rake but that it is a sheet-iron piece that you and he, together, cut from your Triumph reaper, is not that so?

A. That is so.

X Q. 115. Then, if you are right and Mr. Heller is wrong, it *it* would seem, provided Mr. Heller thought he was telling the truth, that he must have cut another one very similar to that about
186 two years before, would it not?

(Objected to as argumentative.)

A. He is mistaken about that board; that board is from my machine.

X Q. 116. Yes, it would seem that Heller must have had another one upon his machine.

X Q. 117. You consider Mr. Heller an intelligent man, do you not?

A. I don't know; he fixes round on machines a great deal and can make them go, when they are out of order.

X Q. 118. Do you know whether Mr. Heller ever had — Triumph reaper?

A. Yes, he had one. I was mistaken, I was thinking of a Beloit; he did not have a Triumph.

X Q. 119. Before you made the last correction, Mr. Whitney told you you were mistaken in your answer, did he not?

A. Yes.

Redirect examination by Mr. BANNING:

R. D. Q. 120. You say that before you made the correction in your last answer, Mr. Whitney had suggested that you were mistaken; was it not some time after that remark of Mr. Whitney, before you made the correction and after you had thought it over?

A. Yes.

R. D. Q. 121. Did you make that correction because of any suggestion or remark on the part of Mr. Whitney, or because on thinking it over you saw you had been mistaken in your answer?

A. Yes, I meant the Beloit and I said the Triumph.

R. D. Q. 122. Did Mr. Heller ever have a Triumph reaper?

A. No, I think not.

R. D. Q. 123. Did he have a Kirby reaper?

A. Yes.

R. D. Q. 124. You have said that other farmers may have tacked a piece of cloth on the rollers of their butt-adjusters; did you ever know any one to do so?

A. Some had it on and some did not.

R. D. Q. 125. Did you ever know of anybody else having a piece of cloth on the roller of their butt-adjuster with stripes in it like this one?

A. I don't know.

R. D. Q. 126. You never saw any one with those stripes in it?

A. No, I couldn't tell.

187 R. D. Q. 127. If they had such stripes in them you did not know it?

A. No, I didn't know it.

R. D. Q. 128. In one place in your cross-examination you spoke about the board having been taken from your machine, what did you mean by the board?

A. I meant the sheet-iron board.

GOTTHILF SCHLESENER.

RICHARD MESSING, a witness produced, sworn and examined on the part of the complainant in answers to questions by Mr. BANNING deposes and testifies as follows:

Q. 1. State your name, age, residence and occupation.

A. Name, Richard Messing; age, 23; residence, Union township, Dickinson county, Kansas; occupation, farmer.

Q. 2. How long have you been farming in Union township?

A. I have been farming in Union township for 9 years.

Q. 3. Are you acquainted with Gotthilf Schlesener?

A. Yes, sir.

Q. 4. How long have you known him?

A. I have known him about 8 years.

Q. 5. Are you acquainted with Gottlieb Heller?

A. Yes, sir.

Q. 6. How long have you known him?

A. I have known him personally about as long as I have known Schlesener; about 8 years.

Q. 7. Did you ever buy a self-binder and reaper from Gottlieb Heller?

A. My father did.

Q. 8. Was that what was known as a Beloit machine?

A. Yes, sir.

Q. 9. Had that machine been used before your father bought it?

A. Yes, sir.

Q. 10. Who had owned or used that machine before your father bought it?

A. Gotthilf Schlesener.

Q. 11. What year was it that your father bought this machine?

A. It was in 1882.

Q. 12. What time of the year was it?

A. Very shortly before harvest.

188 Q. 13. Did you see that machine at the time your father bought it?

A. I did.

Q. 14. Was it brought directly from Schlesener's farm to your father's farm?

A. Yes, sir, I brought it there myself.

Q. 15. It had on it a butt-adjuster, did it not?

A. Yes, sir.

Q. 16. Was there any extension or prolongation of any kind on the butt-adjuster?

A. There was.

Q. 17. State whether that butt-adjuster extension was of wood or iron.

A. It was of sheet iron.

Q. 18. How was it fastened to the butt-adjuster?

A. It was fastened by an iron bar or strap iron, rigidly.

Q. 19. Look at this butt-adjuster, before you, and this iron adjuster extension marked, "Defendants' Exhibit Heller Butt-adjuster with Adjustable Extension, parts 1 and 2," and state what they are if you know?

A. I did not run the machine long enough to get acquainted with the butt-adjuster well enough to know it after 6 years; but I know it had an adjuster just like this one with an extension like this iron piece.

Q. 20. Was the strap iron on the iron piece bent at about 45° near one end as shown in this piece before you or was it extended out straight?

A. It was straight.

Q. 21. How was the extended portion of the bar, or strap iron attached to the butt-adjuster?

A. It was fastened by a bolt or screw, or two screws; I can't tell just exactly whether it was bolts or screws.

Q. 22. Did this method of attachment hold the sheet-iron extension fast, or rigid with the butt-adjuster, so that its positions changed as the position of the butt-adjuster changed or loosely so that it could assume different positions without reference to the position of the butt-adjuster?

(Objected to as leading.)

A. It was rigid so that it could not move without moving the butter.

Q. 23. The extension, then, was not pivotedly connected with the butt-adjuster?

A. No, sir.

Q. 24. How long did this machine which your father got from Schlesener remain at your father's place?

A. It remained there till the spring of 1883.

189 Q. 25. Who got it then?

A. We were ordered by Mr. Heller to take it down town to Charlie Weaver's place, and we did so.

Q. 26. You say that was in the spring of 1883?

A. It was.

Q. 27. Was any change made in the method of attaching the iron extension to the butt-adjuster, after the machine was brought from Schlesener and while it remained at your father's place?

A. No, sir.

Q. 28. I believe you have said in effect, that you never examined all of the details of the butt-adjuster?

A. I didn't.

Q. 29. I believe you have said that when you got the machine from Schlesener the iron extension that was on the butt-adjuster was similar to this one before you?

A. It was similar to that one, only that iron, I know, was straight.

Q. 30. You mean this bar or strap iron?

A. The strap iron.

Cross-examination by Mr. DYRENFORTH:

X Q. 31. What was your age at the time you took the harvester and binder from Schlesener's farm to your father's farm?

A. 17 years.

X Q. 32. How do you know that this occurred in the year 1882?

A. Because we bought a new binder in 1883, and this was the year before.

X Q. 33. You state this all purely from memory, don't you?

A. Yes, sir.

X Q. 34. Who took the binder from your father's farm to Weaver's farm?

A. I did.

X Q. 35. Do you know how long it stayed at Weaver's farm?

A. I think it was removed that spring, towards harvest.

X Q. 36. Do you state that fact from your own knowledge, or from hearsay?

A. From hearsay.

X Q. 37. Do you know of your own knowledge where it went to from Weaver's farm?

A. No, sir.

X Q. 38. Supposing this to be the same butt-adjuster and extension that was on your father's machine, how long was it from the time you took to Weaver's farm before you saw it again?

A. It was about five years.

190 X Q. 39. When did you next see it?

A. I saw it next when Mr. Whitney fetched it up to my house for inspection.

X Q. 40. When was that?

A. That was in April of 1888.

X Q. 41. About two weeks ago?

A. A little more than two weeks ago, that is, I supposed it to be the same one.

X Q. 42. Then you don't know anything about any change having been made, by which the extension was made pivotal?

A. I do not.

X Q. 43. And you don't know anything about any pivotal extensions having been made before that time, do you?

A. I do not.

X Q. 44. Did you run the harvester in the field?

A. I did.

X Q. 45. Was that the first one that you ever ran—I refer to the one your father got from Schlesener's farm?

A. It was.

X Q. 46. Did you know much about harvesting machines at that time, or was this about your first experience with them?

A. It was about my first experience.

X Q. 47. You were quite a young boy and had not paid much attention to harvesting machinery before that, is not that correct?

A. Yes.

Redirect examination by Mr. BANNING:

R. D. Q. 48. Did you ever see any other harvester besides the one that your father got from Schlesener that was provided with an extension like this iron extension before you?

A. I did not—that is, not until I saw this one.

R. D. Q. 49. This machine then, was the only that you had ever seen, provided with an extension like this one?

A. Yes, sir, it was.

RICHARD MESSING.

Adjourned till Monday, April 23, 1888, at 10 o'clock.

Met pursuant to adjournment, present as before, April 23, 1888.

GOVENOR TEATS, a witness produced, sworn and examined on the part of the complainant, in answers to questions by Mr. BANNING deposed and testified as follows:

191 Q. 1. What is your name, age, residence and occupation?

A. Govenor Teats; age, 29; residence, Hope, Dickinson county, Kansas; occupation, attorney-at-law.

Q. 2. Are you acquainted with a man named Gottlieb Heller of Dickinson county, Kansas?

A. Yes, sir.

Q. 3. How long have you known him?

A. I have known him several years, last past, but not personally, only about a year.

Q. 4. Look at this exhibit, in two parts, marked, "Defendants' Exhibit Heller Butt-adjuster, with Adjustable Extension," part 1 and 2, and state whether you ever saw it before?

A. Yes, sir.

Q. 5. Did you ever have any conversation with Mr. Heller about this exhibit?

A. Yes, sir.

Q. 6. Was the exhibit present at the time you had your conversation with Mr. Heller?

A. Yes, sir.

Q. 7. When was it that you had this conversation with him?

A. About 30 days ago.

Q. 8. Who was present at the conversation?

A. Mr. Whitney, besides Heller and myself.

Q. 9. Where was it that you had that conversation?

A. At Mr. Heller's residence near Dillon.

Q. 10. I will ask you to state what Mr. Heller said he made the

sheet-iron part of this exhibit, marked part 2, out of, if he made any statements on the subject?

By Mr. DYRENFORTH: Question is objected to as incompetent, irrelevant and immaterial, and as not calling for any testimony in rebuttal of any of the testimony taken in behalf of the defense.

A. He stated that he made it out of a piece of sheet iron from his old Kirby self-rake.

Q. 11. Did you ask him what he made that sheet-iron part of the exhibit out of?

(Same objection.)

A. Mr. Whitney did.

Q. 12. And he gave that as his answer?

(Same objection.)

A. He did.

Q. 13. Did he say anything about this piece of bar or strap iron that is riveted on the sheet iron, if you remember?

(Same objection.)

192 A. When the question was asked as to whether or not the bar or piece of wrought iron was originally on the sheet iron, he answered no, but that he made it out of a piece of iron he had and riveted it to this sheet iron.

By Mr. DYRENFORTH: Counsel for defendants gives notice that as this testimony is not in rebuttal of any of the testimony given by Gottlieb Heller he will claim the right to take additional testimony to explain the facts alleged by this witness, particularly as the proper person to be called was not this witness, nor Mr. Whitney, but Mr. Heller himself.

Cross-examination by Mr. DYRENFORTH, without waiver of foregoing objections:

X Q. 14. At whose instance did you go to Mr. Heller's farm about 30 days ago?

A. At the instance of Mr. Whitney.

X Q. 15. Were you not the notary public employed by the defense to take depositions in this suit about a year ago?

A. Yes, sir.

X Q. 16. How did you become acquainted with Mr. Whitney?

A. He came to my office at Hope and introduced himself.

X Q. 17. It is about 6 or 7 miles from Hope to Heller's farm, is it not?

A. About that.

X Q. 18 Was any inducement offered to you to cause you to go with Mr. Whitney to Heller's farm?

A. In which way do you mean?

X Q. 19. In any way.

A. Yes, I was employed by Banning & Banning to look up testimony in the case, as a local attorney.

X Q. 20. You was employed as local attorney since the time when you acted as notary in behalf of the defendants, were you not?

A. Yes, sir.

X Q. 21. How long ago were you employed as local attorney by Messrs. Banning & Banning?

A. I think I was employed some time in June, 1887?

X Q. 22. Did you not go with Mr. Whitney to Mr. Heller's farm with a view to repeating on the witness stand what Mr. Heller said?

A. No, sir. I had no idea of being used as a witness.

X Q. 23. In your capacity of local attorney have you visited various farmers and talked with various persons, with a view to finding testimony in rebuttal in this case?

A. Yes, sir.

193 X Q. 24. Were you with Mr. Whitney at the time he visited the farm of any one else besides Mr. Heller in regard to this matter?

A. I was with him when he went the second time to see Mr. Schlesener.

X Q. 25. Had you seen and talked with Mr. Schlesener concerning this matter, before Mr. Whitney had seen him?

A. No, sir.

X Q. 26. After taking the depositions in behalf of the defense about a year ago, you retained this Exhibit "Heller Butt-adjuster with Adjustable Extension" for a considerable time in your possession, did you not?

A. I don't think I did. I left it to my clerk to pack and ship, as instructed by Mr. Parkinson, as I was attending district court at Abilene at the time, and when I got home, I found a letter from Dyrenforth & Dyrenforth asking why the exhibit was not shipped; I immediately shipped it.

X Q. 27. Do you remember what month that was in?

A. The last of May, I think, or the first of June.

X Q. 28. When you got back to your office, did you find that the letter had been awaiting you some days?

A. I don't remember as to that.

X Q. 29. Are you sure that was not till after the 15th of June that you saw that letter?

A. I can't say; I shipped the machine as soon as I saw the letter, that is my recollection of it now.

X Q. 30. Do you recognize the press copy I now show you as being a copy of the letter to which you refer?

A. I think that is the substance of what you wrote.

X Q. 31. The date of this letter is June 13th, 1887, is it not?

A. Yes, sir.

X Q. 32. And assuming it to have been posted on the day of its date, it could not have reached Hope until the 15th of June, could it?

A. If it started on the 13th, at that time, it would have reached Hope probably on the 15th, or more likely on the 16th.

X Q. 33. And if it had been in your office some days before you returned it would have been probably in the neighborhood of the 20th that you saw the letter, would it not?

A. I cannot say as to that; it might have laid there one day and not more than two or three days.

194 X Q. 34. Can you not fix the time more definitely when you returned to Hope after attending the district court of Abilene?

A. I cannot fix the date at present, as I sometimes return on Saturdays, sometimes on Sunday, and if business called me away, not for several days; as to this identical time I cannot say.

X Q. 35. Did you attend district court at Abilene several different times, during the months of May and June, 1887?

A. Yes, sir.

X Q. 36. You see now that you were at least a couple of weeks out in your reckoning when you fixed the time of returning the exhibit as being the end of May or the beginning of June, do you not?

A. Yes, sir.

Redirect examination by Mr. BANNING:

R. D. Q. 37. You have said on cross-examination that as you remembered it you were detained as local counsel by us in June, 1887, and counsel has endeavored to show that during the month you still had in your possession the exhibit about which you have been examined this morning. Please look at this letter-press copy of this letter by us to you, dated July 30, 1887, and state whether or not you recognize it as a copy of the first letter we wrote you relative to the subject of your retention as a local counsel?

A. Yes, sir, I so recognize it.

R. D. Q. 38. Then, as it now appears, you were not retained by us, or the complainant, until after July 30, 1887, is that correct?

A. Yes, sir, that is correct. I wish to make an explanation as to the dates; I had not thought of them before, and was under the impression that it was in the latter part of June, or some three or four weeks after taking the depositions by Mr. Parkinson in May that I was retained by Banning & Banning as local attorney.

R. D. Q. 39. Then, as I understand, your office and duties as notary had ceased before you were employed to do anything in behalf of the complainant.

A. Yes, sir. And it was some time after I had shipped the exhibits, that I was employed by Banning & Banning.

R. D. Q. 40. You have been asked something about your compensation in assisting us as local counsel. I will ask you to

195 state what, if anything, Mr. Heller told you about compensation that he received from the McCormick Harvesting Machine Company, or others in connection with the testimony that was given by Heller and others in reference to this butt-adjuster exhibit before us?

Objected to as incompetent and hearsay, and counsel repeats his statement that he will claim the right to explain the matters testified to by this witness, especially on the ground that they are new matter and not in rebuttal.

A. In July or August, 1887, Mr. Heller rode into Hope with a new buggy. I was complimenting him on his new buggy, and he made the remark—yes, I got that for my evidence in the harvesting-machine case. At a latter date, while at his place he again reiterated the statement, and said that he might have got more if he had been a little sharper. He stated that he got an order for a machine on Berry Bros., at Abilene, but that as he had machines enough he made a trade with them for the buggy and a windmill.

Recross-examination by Mr. DYRENFORTH.

R. X Q. 41. At the time you served as notary for the defendants in this case about a year ago, there were several witnesses examined before you, were there not?

A. Yes, sir.

R. X Q. 42. About how many altogether?

A. There was six or seven, I think.

R. X Q. 43. Do not the places of residence of those various witnesses cover a considerable area of territory?

A. Yes, sir.

R. X Q. 44. And you understand, do you not, that somebody had to go and see those various witnesses and talk with them before they were called to the witness stand; at least by analogy to your own actions that is what you would suppose, is it not?

A. Certainly; some one would have to go to see these witnesses and get them to come before a notary where they were not served, as in this case.

R. X Q. 45. And somebody familiar with the subject and acquainted with the people would be the proper person to go about to see various people and talk with them and find out whether
196 they knew or remembered enough about certain facts to make them desirable as witnesses, is not that so?

A. Certainly, I should think so.

R. X Q. 46. And it would not be surprising if he should talk to a dozen, or fifteen, or twenty people about the matter in a case where six of them were examined as witnesses, would it?

A. I presume that all depends on circumstances.

R. X Q. 47. But my question is, as to whether it would be surprising or not?

A. It would only be surprising if they talked to the parties who did not know anything about the case. But it would not be surprising if twenty people were seen and talked with concerning the case, who were supposed to know sufficient about the case to be witnesses.

R. X Q. 48. And it would not be surprising, would it, if only about six out of all that number were found to know or remember enough

about the facts after a lapse of several years to make it worth while to call them as witnesses, would it?

A. No, not at all.

R. X Q. 49. And in your farm country, any one seeing a dozen or fifteen people would have to do a large amount of travel, would they not?

A. That would depend on circumstances, the distance the farmers live, as in this matter the witnesses and the probable witnesses that a party would likely wish to see, live within a radius from Hope of about 8 or 9 miles at the furthest, some living northwest and some southeast from Hope.

R. X Q. 50. Did you ever try seeing as many as a dozen or 15 different people and talking with them, even in a large city where transit is easy and rapid, and find out what an undertaking it is?

A. Yes, sir.

R. X Q. 51. Even that is considerable of an undertaking when you have to go from one to another, is it not?

A. It occupies time, but I do not consider it a very great undertaking.

R. X Q. 52. It is much more of an undertaking out in the country where one has to drive from farm to farm, is it not?

A. Yes, sir; it requires more time. This depends upon the distance, of course.

197 R. X Q. 53. Do you not think that any one who would execute such an undertaking gratuitously would be a remarkably charitable person, to say the least?

A. For a corporation, yes, he would be a very remarkable person.

R. X Q. 54. You think he would be more charitable if he did it for a corporation than if he done it for an individual, do you?

A. I do not think charity would enter into the element of the spirit if he was acting for a corporation; the party would be very foolish, I presume.

R. X Q. 55. You would not do it yourself unless you were very well paid for it, would you, Mr. Teats?

A. Not for a corporation, as it is supposed they are able to pay.

R. X Q. 56. Now, don't you know that it is a fact that the McCormick Company employed Mr. Heller to drive about the country to find all the witnesses he could to testify concerning the spring wind-board, and that Mr. Heller did so, and that some of the persons that he saw were examined before you as a notary public a year ago?

A. I don't know anything about it.

R. X Q. 57. What was the value of the buggy you saw Mr. Heller have?

A. I do not know. I presume it was worth from $125 to $150.

R. X Q. 58. What was the value of the windmill?

A. I do not know what we would have to pay for one now, probably, from $35 to $50.

R. X Q. 59. What should you suppose the manufacturer's price of such a buggy to be?

A. I suppose from $85 to $100. I don't know, though.

R. X Q. 60. What would you suppose the manufacturer's price for a $50 windmill to be?

A. About $33 or $35.

R. X Q. 61. Then it would be fair to suppose, would it not, that the person who gave the buggy and the windmill to Mr. Heller gave him the equivalent of something less than $150?

A. I do not know.

R. X Q. 62. Now, did not Mr. Heller tell you that he had received this buggy and windmill for the work in obtaining evidence in this case, or is not that the impression that he conveyed to your mind?

A. No, sir.

198 R. X Q. 63. Do you mean to say that Mr. Heller gave you the impression that he was paid for giving testimony that was false?

A. Yes, sir, and also for keeping quiet as to the spring board at the bottom of the deck, that is the impression that was made on my mind at the time.

R. X Q. 64. Now give the exact language that Mr. Heller used that gave you that impression.

A. I have given it in my answer before; it is, I think, almost verbatim, as follows:—Yes, I got that buggy for my evidence in the harvesting-machine suit or case. This was expressed to me in front of the bank at Hope, on the sidewalk, in my first conversation with Mr. Heller and while at his farm he was demonstrating the working of the binder and said that he put on the drop-deck the same time he made the extension to the butter, that he was not to say anything about that.

R. X Q. 65. Did you have this conversation with Mr. Heller after you had begun detective-work for Wm. Deering?

A. Well, I do not know whether it was "detective-work" or not, but it was after I was retained as local counsel for them.

R. X Q. 66. And being thus employed you had a natural zeal to corner Mr. Heller if you could, did you not?

A. He made his statements voluntarily.

R. X Q. 67. And did you put the best or the worst construction on them?

A. I do not know as I put any construction on them, I took them for what he said.

R. X Q. 68. Mr. Heller is a German, is he not, and speaks broken English?

A. Not very broken, he speaks very good English; I think, however, you would know that he was a German, by his language.

R. X Q. 69. Do you know what church he belongs to?

A. No, sir, I never inquired into his religious belief.

R. X Q. 70. Are you paid for coming here to give this testimony?

A. I am paid my expenses, that is all that I know of.

R. X Q. 71. Do you not expect to be paid also for the time lost and do you not know that it would be a usual and proper thing to pay you reasonably and fairly for your time, consumed in this matter?

A. It would be very reasonable, but as I have other busi-
199 ness in the city, I did not expect to charge them for the time consumed, what I would have charged at the least if I came for the express purpose.

R. X Q. 72. Then, in a certain sense it would be proper to say that you are compensated for your testimony in this case, would it not, understanding, of course, that the expression is used in the most honorable and respectful sense toward you?

A. Certainly, but I wish to explain, at the time Mr. Whitney left Hope we did not expect that they would wish me as a witness so I wrote to Messrs. Banning & Banning and told them that as I had business here that I would like to attend to but would not make a trip expressly for it, I would come upon their paying my expenses, and a nominal compensation, and as I had business in Kansas City to wire me there.

R. X Q. 73. About how much would your expenses amount to?

A. About $33 railroad fare and $4 or 5 per day hotel and incidental, more or less.

R. X Q. 74. That alone would buy a pretty good windmill, would it not?

A. That amount of money would, yes.

R. X Q. 75. And you have been paid for other services before this, have you not?

A. Certainly.

R. X Q. 76. Enough to buy a buggy?

A. No, sir.

R. X Q. 77. Now, Mr. Teats, don't you realize that notwithstanding the remarkable analogy between your own position and that of Mr. Heller you have been willing, here on the witness stand, to put a construction upon Mr. Heller's language, used in conversation with you, which would tend to blast Mr. Heller's reputation?

A. I would not have so construed it if he had told me that the machine he got was for the work he done in helping to procure witnesses and the construction, as you call it, of Mr. Heller's language is made from what he said, the meaning of the words he said.

R. X Q. 78. Suppose you were to say to somebody that you had been paid the equivalent of $50 for your testimony here in Chicago, which would be true, and that if you had been sharper you could have got more, would it be fair for anybody to suppose from that that you had testified falsely?

A. I haven't so construed it; I haven't put a construction
200 upon his language, I am only taking it for what it is worth; if I should tell a man that I got $50 or $150 for my testimony in a certain case without further explanation, I would naturally suppose the party to construe the meaning of what I said, that my testimony was bought. Of course a witness in all cases receives his expenses and just compensation for his time or should at least, which that fact alone does not indicate that his testimony is purchased.

GOVENOR TEATS.

201 Received for record April 8th, 1881, and recorded Liber L 26, page 240, of Transfers of Patents.

In testimony whereof I have caused the seal of the Patent Office to be hereunto affixed.

[SEAL.] EMMERABLE,
*Commissioner.*

Ex'd: F. C. T.

Whereas I, William F. Olin, of Chicago, county of Cook, State of Illinois, did obtain letters patent of the United States for improvements in harvesters, which letters patent are numbered 223,812 and bear date the 27th day of January, one thousand eight hundred and eighty; and whereas I am now sole owner of said patent and of all rights under the same; and whereas William Deering, of Chicago, county of Cook, and State of Illinois, is desirous of acquiring the entire interest in the same:

Now, therefore, to all whom it may concern be it known that for and in consideration of the sum of one dollar to me in hand paid and other good and valuable consideration, the receipt of which is hereby acknowledged, I, the said William F. Olin, have sold, assigned, transferred, and set over, and by these presents do sell, assign, tranfer, and set over, unto the said William Deering all the right, title, and interest whatsoever which I have in and to the said improvement in harvesters and in and to the letters patent therefor aforesaid, the same to be held and enjoyed by the said William Deering for his own use and behoof and for the use and behoof of his legal representatives to the full end of the term for which
202 said letters patent are *as* may be granted as fully and entirely as the same would have been held and enjoyed by me had this assignment and sale not been made.

In testimony whereof I have hereunto set my hand and affixed my seal this fourth day of April, A. D. 1881.

WILLIAM F. OLIN. [SEAL.]

In presence of—
L. H. JEWETT, *Witness.*
J. F. STEWARD, "

203 Whereas letters patent of the United States No. 272,598 were issued to John F. Steward, February 20, 1883, for an improvement in grain-binders; and

Whereas William Deering, of Chicago, Illinois, is desirous of acquiring an interest in said letters patent:

Now, therefore, know all men by these presents that for and in consideration of one dollar and other good and valuable considerations to me in hand paid, the receipt whereof is hereby acknowledged, I, the said John F. Steward, have sold and assigned, and hereby sell and assign, to the said William Deering all my right, title, and interest in and to said letters patent No. 272,598 and in and to all claims or rights of action arising out of or accruing from past infringements thereof, the same to be held and enjoyed by the said William Deering, his heirs and assigns, to the full end of the

term of said letters patent and all extensions thereof as fully and entirely as they would have been held by me if this assignment and sale had not been made.

In witness whereof I have hereunto set my hand and seal this 8th day of June, A. D. 1885.

JOHN F. STEWARD. [SEAL.]

204 UNITED STATES OF AMERICA:

Circuit Court of the United States, District of Minnesota, Third Division.

I, Oscar B. Hillis, clerk of said circuit court, do hereby certify and return to the honorable the Supreme Court of the United States that the foregoing, consisting of 204 pages, numbered consecutively from one to 204, inclusive, is a true and complete transcript of the records, process, pleadings, orders, final decree, and all other proceedings in said cause in accordance with the stipulation of the solicitors for the respective parties and of the whole thereof, as appears from the original records and files of said court; and I do further certify and return that I have annexed to said transcript and included within said paging the original citation, together with the proof of service thereof.

In witness whereof I have hereunto set my hand and affixed the seal of said court, at Saint Paul, in the District of Minnesota, this 6th day of October, A. D. 1890.

[Seal U. S. Circuit Court, District of Minnesota, Third Division.]

OSCAR B. HILLIS, *Clerk*,
By —— ——, *Deputy*.

205 [Stamped:] Office Supreme Court U. S. Filed Feb. 13, 1893. James H. McKenney, clerk.

Supreme Court of the United States, October Term, 1892.

WILLIAM DEERING
*vs.*
THE WINONA HARVESTER WORKS *et al.*

Appeal from the circuit court of the United States for the district of Minnesota.

To Messrs. Dyrenforth & Dyrenforth, counsel for said appellees in the court below:

Please take notice that on Monday, the 13th day of February instant, upon the coming in of the court or as soon thereafter as counsel can be heard, we shall move said court to transfer certain matter from the transcript of the record in the case of the above complainant against the McCormick Harvesting Machine Company to the transcript of the record in this cause. A copy of our motion

to be then presented and of an affidavit in support of the same is hereto attached.

Chicago, February 6, 1893.

EPHRAIM BANNING,
*Counsel for Appellant.*

STATE OF ILLINOIS, }
*County of Cook,* } *ss:*

Samuel E. Hibben, being duly sworn, on oath deposes and says that he served the above notice and the annexed motion and affidavit upon Messrs. Dyrenforth & Dyrenforth, above named, by delivering a copy of said notice, motion, and affidavit to Mr. P.
206 C. Dyrenforth, the senior member of said firm, at their office, in Chicago, on the 6th day of February, 1893.

SAMUEL E. HIBBEN.

Subscribed and sworn to before me this 7th day of February, 1893.

[Notarial Seal of Millie J. Frost, Cook County, Ill.]

MILLIE J. FROST,
*Notary Public.*

Supreme Court of the United States, October Term, 1892.

WILLIAM DEERING }
*vs.*
THE WINONA HARVESTER WORKS *et al.* }

Appeal from the Circuit Court of the United States for the District of Minnesota.

And now comes William Deering, the appellant, and moves the court for an order transferring from the record in William Deering *vs.* The McCormick Harvesting Machine Company, pending in this court as No. —, to the record in the above-entitled cause everything except the bill, answer, replication, orders, and opinion of the court, and that the clerk be directed in the printing of the transcript of the record in the above-entitled cause to include and print such matter so far as the same does not involve a mere duplication, and for grounds of such motion shows the facts and circumstances set forth in the affidavit of Thomas A. Banning, hereto attached.

EPHRAIM BANNING,
*Counsel for Appellant.*

There is no objection to the grant of the transfer asked in the above motion so far as the McCormick Harvesting Machine Co. is concerned.

ROBT H. PARKINSON,
*Counsel for McCormick Harvesting Machine Co.*

207 Supreme Court of the United States, October Term, 1892.

WILLIAM DEERING )
*vs.*
THE WINONA HARVESTER WORKS *et al.* )

Appeal from the circuit court of the United States for the district of Minnesota.

STATE OF ILLINOIS, )
*County of Cook,* ) *ss*:

Thomas A. Banning, of Chicago, Illinois, being duly sworn, on oath deposes and says that he is one of the counsel for the appellant in the above-entitled cause and, as such, is familiar with the proceedings therein; that at the time the appeal in said cause was taken an appeal was also taken in the case of the same complainant against the McCormick Harvesting Machine Company, in which the same patents, the same questions, and substantially the same evidence involved in this appeal were included; that at the time of such appeals counsel for above parties, to save duplicating the records in this court, entered into a stipulation that this cause might be heard on the record in the McCormick case, and that a transcript of separate matter only should be taken up in this cause, the particular clause of the stipulation covering this matter reading as follows:

"It is hereby agreed that in the Supreme Court the record in the case of this complainant against the said McCormick Harvesting Machine Company shall be used and treated in every respect as the record on the appeal in this suit and be referred to and used in argument in the Supreme Court the same as if separately certified up and printed at length in this suit."

Affiant further states that in pursuance of such agreement a transcript of special matter was certified up in this cause and
208 a full transcript in the McCormick case; that the transcript of the record has not yet been printed in either of said cases; that the McCormick case has been settled, so that there is no longer any occasion to print the transcript in that case nor to argue the same, and that by reason of the settlement of the McCormick case it has become necessary to either complete the record in this cause by having additional matter certified up by the clerk, at an expense of several hundred dollars, or by having the matter already certified up in the McCormick case, on which it was stipulated this cause might be heard, transferred so as to be printed and used herein.

THOMAS A. BANNING.

Subscribed and sworn to before me this 6th day of February, 1893.

[Seal of Samuel E. Hibben, notary public, Cook county, Chicago, Ills.]

SAMUEL E. HIBBEN,
*Notary Public.*

(Endorsed:) Case No. 14,369. Supreme Court U. S., October term, 1892. Term No., 578. Wm. Deering, app't, *vs.* The Winona Harvester Works *et al.* Motion to incorporate in record in this case a portion of the record in the case of Deering *vs.* The McCormick Harvesting Machine Co.

(Stamped:) Office Supreme Court U. S. Filed Feb. 13, 1893. James H. McKenney, clerk.

209 Supreme Court of the United States, October Term, 1892.

WILLIAM DEERING, Appellant,
*vs.*
THE WINONA HARVESTER WORKS *et al.* } No. 578.

On consideration of the motion to incorporate into the transcript of the record in this cause certain matter from the transcript of the record in case of William Deering, appellant, *vs.* The McCormick Harvesting Machine Co., it is now here ordered by the court that said motion be, and the same is hereby, granted.

March 13, 1893.

64 EXTRACTS FROM RECORD IN CASE OF DEERING *v.* McCORMICK HARVESTING MACHINE CO.

COMPLAINANT'S RECORD.

It is admitted by complainant for the purpose of this suit that defendant's machine does not infringe the fourth claim of the Olin patent.

65 *Complainant's Prima Facie Evidence.*

Testimony on the part of complainant, taken January 20, 1886, in the case of this complainant against The Winona Harvester Company, and by agreement of parties stipulated this 3d day of June, 1886, into the above-entitled cause, with such changes as to name of machine as makes the same applicable to this cause, with additional examination and cross-examination by Mr. Thomas A. Banning and Joseph G. Parkinson respectively.

Present at the original taking: Thomas A. Banning, of counsel for complainant, and Philip C. Dyrenforth, of counsel for defendant.

WILLIAM S. BATES, a witness produced, sworn and examined on the part of complainant, in answer to questions by Mr. BANNING, deposed and testified as follows:

Q. 1–*1*. State your name, age, residence and occupation.

A. William S. Bates, age, 33, residence, Chicago, Illinois, occupation civil and mechanical engineer.

Q. 2–*2*. State what experience you have had, if any, in mechan-

Italic Nos., McCormick case.

ical pursuits, examining letters patent and mechanical devices, and as an expert in patent cases.

A. I have been engaged in mechanical studies and pursuits for some fifteen (15) years last past. In the practice of my profession I am daily brought in contact with mechanical devices of various kinds, and am required to examine the same critically and analytically for various purposes. I was at one time engaged as a solicitor of patents, and became familiar with drawings and specifications of patents in general, and for a number of years I have been very frequently called upon to testify as a mechanical expert in patent cases.

66 & 67

Q. 6–6. Look at this full-sized self-binding harvester before you marked "Winona," and state whether you have examined and understand the construction and operation of the same.

A. I have examined it and believe I understand its construction and operation.

Counsel for complainant asks counsel for defendant whether he will admit that the full-sized self-binding harvester referred to in the previous question is one of the defendant's manufacture, and that they have manufactured and sold such harvesters prior to the filing of the bill in this case, and after the issuance of the various patents sued on.

By Mr. DYRENFORTH: The machine referred to is a Winona binder, and machines of this description were manufactured and sold by the defendants before the commencement of this suit, and after the issuance of the various patents sued on.

68

Counsel for complainant offers in evidence certified copy of letters patent of the United States No. 223,812, issued January 27, 1880, to William F. Olin, of Chicago, Illinois, being one of the letters patent sued on in this cause.

Also assignment of all the right, title and interest of said Olin in and to said letters patent No. 223,812, sued on, to William Deering, the complainant, dated the 27th day of November, 1883, unrecorded.

By Mr. DYRENFORTH: I object to the instrument of assignment offered by the complainant on the ground that it is unrecorded, and that there is no proof that it was executed upon the date it bears, or prior to this suit.

I request counsel for the complainant to make on the record the statement which, after the above objection was entered, he frankly made off the record concerning the assignment referred to and which explains the singularly fresh appearance of the ink in that instrument.

Counsel for complainant states that the particular assignment offered in evidence under the Olin patent was executed this morning, but that it is a repetition or re-execution of an assignment that was actually executed and delivered previous to November 27, 1883, from the said Olin to the said Deering, under the said patent, which has become lost and cannot now be found.

69

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Italic Nos., McCormick case.

The facts about this matter can be ascertained from John F. Steward, whom we expect to call as a witness in this cause, and we now so inform defendant's counsel so that he may inquire more fully into the matter, if he desires when Mr. Steward is called as a witness.

By Mr. DYRENFORTH: In view of the statement of counsel for complainant the instrument of assignment is further objected to as incompetent and void for the purpose of this suit.

The offer of the letters patent No. 223,812 is objected to since the legal title thereto is not shown to have been in complainant at the time this suit was commenced.

Q. 9–*9*. Look at the letters to Olin offered in evidence and state whether you understand the construction and operation of the combinations and devices therein described and claimed.

A. I have examined and believe I understand the same.

Q. 10–*10*. What would you say about the clearness and plainness of the specification and drawings of said patent to enable a person skilled in the art to manufacture and use the combination and devices therein described and claimed?

A. In my opinion they are sufficiently clear and plain to enable such a person to manufacture and use the invention.

Q. 11–*11*. Look at the defendant's binder before you, and compare the combinations and devices therein contained with the claims of the Olin patent sued on, and point out its resemblances, if any, to the combinations and devices claimed in said Olin patent, and if, in your opinion, said binder contains the combinations and devices claimed in any of the claims of the patent sued on, point out what claims, and give your reasons at length for any opinion you may express.

A. I have made the comparison. In my opinion the defendant's binder contains the combinations set forth in the Olin patent, and more particularly recited in the first, second, third, fourth and sixth claims.

My reasons for this opinion are as follows:

The first claim of the Olin patent is in the following words: "In combination with a harvester elevator, a swinging elevator pivoted at its lower end, and suitable devices for shifting its upper
70 end, whereby the swinging elevator forms a means for elevating the butts of the grain and delivering grain of different lengths at the same points, substantially as specified."

In binding machinery of the kind in controversy the grain is received upon the carrier platform, and elevated from it to the point where it is bound. In many cases in being thus elevated it is carried to a higher level than that where the binding is done, and therefore des-ends a short distance to reach the binders. The machine illustrated in the Olin patent is one of this class. In it the grain is elevated from the carrier platform H to the point P, where it is to be bound. This is done by means of an endless belt or belts. In order that long and short grain may be delivered at the same point

a second endless belt is provided, which engages the butts of the grain and pushes the same back so as to bring the middle of the swath to the desired point. This second endless belt is marked Q in the drawing, and is so arranged that it not only pushes the grain back, but also acts as a conveyor to move the butts forward in their path to the binder. As shown and described in the patent, this belt Q is arranged with one end low down near the carrier platform H, and the other end up near the highest point of travel of the grain, but it is obvious that these positions might be changed and the device still operate in exactly the same way to push the grain back and to convey the butts forward. For example, the receiving end of the belt Q might be further along on the path of the grain, even at the highest point on its path, or beyond it, and the delivery end also farther along, even at the point P, or near it. It is also obvious that whatever the position of the belt Q on the machine, its delivery end must be moved back and forth to accommodate grain of different lengths, as the short grain must be pushed further back than longer grain.

I therefore understand the essentials of this device to be that it shall be combined with the devices which elevate or convey the grain from the carrier platform to the binder; that it shall be pivoted at its receiving end, so that its delivery end may swing back and forth to accommodate grain of different lengths, and that its delivery end shall be provided with devices by which it may be moved back and forth for that purpose, and that it is immaterial at just what point in the path of the grain said swinging belt or conveyor Q is located.

71 This is the combination which I understand to be meant by the first claim of this Olin patent, namely, the conveyor which elevates the grain from the carrier platform to the binder, the swinging conveyor which engages the butts of the grain and pushes them back so that the bundle will be centrally bound and assist in conveying said butts to the binder; the pivot at the receiving end of the swinging conveyor, and devices for shifting the delivery end of the same.

I am aware that in the first claim the said swinging conveyor is spoken of as being pivoted at its "lower" end, and having shifting devices at its "upper" end, but I understand these words lower and upper to be merely designatory and used, because, in the location shown it is the lower and upper ends of the device which are referred to, though if the device were differently located these words might have to be transposed to be literally accurate. If the patentee had used the words receiving and delivery, such transposition would not be necessary. I am also aware that in the claims the device is called an elevator, and this is correct, but perhaps slightly misleading, as whatever its position in a machine of the class illustrated in the patent, it assists in elevating the grain from the point H to the point P, even though it were so located that it acted on the grain only on the downward portion of its path.

Turning to the defendant's binder, I find it to be a machine in

which the grain falls onto a carrier platform and is carried from it, or elevated to the binding devices which are located at a higher level on the other side of the driving wheel.

The elevator or conveyor in this defendant's machine which conveys the grain from the carrier platform to the binder is composed partly of two endless canvasses, between which the grain is conveyed to the highest part of the travel, and partly of toothed arms which convey the grain forward to the binders, the latter being located in the downward portion of the path of the grain. Combined with this dual conveyor is a swinging conveyor of the same identical construction as that shown in the Olin patent: that is to say, it is composed of an endless belt moving on pulleys and so arranged as to act on the butts of the grain and convey them forward in their path to the binder, and at the same time push the straws endwise so as to bring them to the proper point to be bound centrally. This
72 swinging conveyor in the defendant's machine is pivoted at its receiving end and its delivery end is provided with devices for shifting it to accommodate grain of different lengths. The function, operation, and purpose of this swinging conveyor in the defendant's machine are identical with those of the swinging conveyor in the Olin patent. It pushes the straws endways so as to deliver them centrally to the binder exactly as Olin's does. It forwards the butts on their path exactly as Olin's does. It is combined with the mechanism which elevates or conveys the grain from the carrier platform to the binder. So is Olin's. It is pivoted at its receiving end, as is Olin's, and its delivery end swings as does Olin's, but the mechanism for shifting the delivery end is slightly different in the two machines. In the defendant's machine a sliding bar is used, and in the Olin a sliding bar and lever. The only differences between them are in the form of the main elevator or conveyor with which the swinging elevator is combined, and in the fact that in the defendant's machine the swinging conveyor is located near the end of the path of the grain to the binder, while in the Olin it is near the beginning of that path.

Therefore, as the defendant's machine contains all the elements of Olin's first claim combined together and operating in the same way, with only such differences as do not affect their function or operation, I say that the defendant's machine contains the invention set forth in the Olin patent, and claimed in the first claim thereof.

The second claim of the Olin patent as I understand it, is for combination of the main elevator or conveyor of the harvester, and the adjustable conveyor or belt Q when the latter has its pulleys arranged parallel with the upper surface of the main conveyor.

I have already explained that the main elevator or conveyor which acts upon the body of the grain and the swinging or adjustable conveyor or belt Q which acts upon the butts of the grain are combined together in the same manner for forwarding the grain on its path to the binder in the defendant's and Olin machines. It will suffice therefore, to add that the wheels or pulleys of the belt of the swinging or adjustable conveyor in the defendant's machine are parallel to that part of the main conveyor with which said belt

is in conjunction, and that the two act together in the same
73 way and that the butts are carried or delivered even with the heads to the binder in both the defendant's and the Olin machines. Therefore I find in the defendant's machine the invention claimed in the second claim of the Olin patent.

The third claim of the Olin patent as I understand it is for the adjustable conveyor or belt Q combined with the main conveyor, and having its receiving end advanced in front of the line of grain travel. The object of this as I understand it is to have the grain delivered straight to the adjustable conveyor so that it will be properly acted upon by the latter.

Turning to the defendant's machine I find that in it the receiving end of the adjustable belt or conveyor is advanced in front of the line of grain travel so that the butts of the grain come squarely against it, instead of being bent back by it exactly as they do in the Olin machine, and therefore this third claim of the Olin patent perfectly describes the defendant's machine, bearing in mind of course the explanation I have made of the words lower and elevator. Therefore the defendant's machine contains Olin's invention as recited in the third claim of his patent.

The defendant's machine does contain the invention set forth in the Olin patent and claimed in the fifth claim thereof for the following reasons:

Said invention relates more particularly to the mechanism for driving the butt-adjuster. As defined in the claim it is a combination of the following elements: The shaft W, which receives motion from the mechanism of the harvester; the wheel *h*, which is a beveled gear mounted on the shaft W; the gear wheel *g*, which is a beveled gear mounted on the butt-adjuster frame and meshing with the wheel *h*.

The pulley wheel *d* which forms the driving pulley for the butt-adjuster belt, and is secured to the wheel *g* so as to move with it.

The frame I which connects the wheels *g* and *h* and keeps them constantly in gear.

As shown and described in the Olin patent, this mechanism is applied to the swinging end of the butt-adjuster, but the patent states that it may be applied to the other end, namely, the pivoted end. As shown and described, the frame is so formed as to have two arms parallel to each other and a connecting piece. In other words, in
the shape of a V. The wheel *h* is between the two arms of
74 the frame *i* so that whichever way the butt-adjuster swings, the wheel *h* will go with it. Obviously, if this mechanism be located at the pivoted end of the butt-adjuster it will be unnecessary to have two arms embracing the wheel *h*, and the construction of frame *i* may be simplified and cheapened by omitting one of said arms. The truth of this will be apparent when we turn to the defendant's machine. In the defendant's machine the mechanism for operating the butt-adjuster is applied to the pivoted end. This mechanism consists of certain instrumentalities, to wit:

A shaft corresponding to Olin's shaft W extending across the harvester and receiving motion from the main gearing of the har-

vester. This shaft, like Olin's, also carries the upper roller of the main elevator butt of the machine.

A bevel gear wheel mounted on the shaft.

Another bevel gear wheel mounted on the butt-adjuster frame and meshing with the first-mentioned gear.

A pulley wheel which forms the driving pulley of the butt-adjuster belt connected to the last-mentioned bevel gear, so as to move with it.

A frame which connects the two bevel wheels, or rather, their shafts, and keeps them constantly in gear. These parts, except the frame, are all just like the analogous parts of the Olin mechanism, and the frame differs from Olin's only in the omission of one of the arms which is rendered unnecessary by reason of the mechanism being applied to the pivoted instead of the swinging end of the butt-adjuster. These parts are all combined together and operate in the same way and perform the same function in the defendant's machine as in the Olin patent and the result secured is the same.

For those reasons, namely, that the defendant's machine contains all the elements of Olin's fifth claim, and in exactly the same combination, I say that it contains Olin's invention as defined in said fifth claim.

The sixth claim of the Olin patent is in terms for a combination of—

The elevator or belt Q; the inclined board R, and the main elevator.

As already explained the main elevator is the mechanism which conveys the grain from the carrier platform to the binder.

The belt Q is the adjustable conveyor which acts upon the butts of the grain.

The inclined board R is a covering board over that portion of the main conveyor which is in conjunction with the belt Q. This board acts to hold the grain down within the action of the main conveyor and the belt Q.

In the defendant's machine I find over that part of the main conveyor which is in conjunction with the belt Q an inclined cover formed of sheet iron which holds the grain down within the action of the conveying mechanism, and prevents its being thrown out or blown away exactly as does the inclined board R in the Olin patent. The only difference between the two is that the inclined cover of the defendant's machine is on the downward portion of the path of the grain, whilst in the Olin it is on the rising portion. This difference does not affect the function or operation of said inclined cover in the slightest degree.

Therefore I find in the defendant's machine the exact combination of the sixth claim of the Olin patent.

In making this statement I have borne in mind that the inclined cover R of the Olin patent is spoken of as the "board" and in the defendant's machine it is made of metal. This, however,

does not affect its function, operation, purpose, or form. Therefore I consider it not material.

76 Counsel for complainant offers in evidence certified copy of letters patent of United States 272,598, issued Feb. 20, 1883, to John F. Steward, of Chicago, Ill., being one of the letters patent sued on in this cause.

Also assignment of all the right, title and interest of the said Steward in and to said letters patent, to William Deering, of Chicago, Ill., dated June 8, 1885, unrecorded.

77–79 By Mr. DYRENFORTH: The instrument of assignment last offered is objected to on the ground that it is not recorded and there is no evidence to show it was executed on date it bears or prior to the commencement of this suit.

80 Cross-examination by Mr. DYRENFORTH:

X Q. *19*–28. Prior to qualifying yourself specially to testify in the present case, what experience had you had in the art of grain binders and harvesters?

A. I have testified several times in cases involving harvester machinery and I have examined a good many machines and a good many patents relating to the same. I have had no special experience however with binders.

X Q. *20*–29. In what suits relating to harvesting machinery have you testified heretofore?

A. I don't know as I can give the titles of them. There were two cases against McCormick. I think one was Penn *vs.* McCormick, and there were several cases of Graham against different parties; one was against the Johnston Harvester Works, and the others I don't remember the names of.

X Q. *21*–30. In what portion of a harvesting machine did the several suits in which you have testified heretofore relate?

A. The Graham related to the adjustment of the cutter bar, and the Penn I think had something to do with the main wheel of the machine, or the frame.

X Q. *22*–31. In what portions of a harvester did the other suits relate in which you have testified, and of which you do not remember the titles?

A. I had one or two I think, on the reel adjustments and gearing. I think the only cases I have had have covered the adjustments and gearing of the cutter bar, the reel and the main frame or main wheel.

X Q. *23*–32. Prior to qualifying yourself to testify in this suit, had you made any particular study of the general art of grain-binders?

A. No.

X Q. *24*–33. When did you begin to qualify yourself to testify in this particular suit?

A. About three weeks ago, I think.

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Italic Nos., McCormick case.

X Q. *25*–34. Have you ever seen a grain-binder in actual operation in the field?

A. Yes, sir.

X Q. *26*–35. Have you made any special investigation
81 & 82 into the prior art of grain-binders as developed by the defenses set up by the defendant's answer in this suit?

A. I have not seen the answer, so I don't know what is set up in it. I examined a great many patents however on the subject to see whether they contained the inventions in controversy, and I found that they did not.

83 Cross-examination by Mr. DYRENFORTH:

X Q. *113*–116. Turning now to the Olin patent No. 223,812, please state whether you find in that patent any statement to the effect that the butt-evener may be placed upon the binding instead of the elevating side of the machine, and thus beyond the elevation aprons, and at about a right angle with them instead of parallel with them.

84 A. The patent contains no such statement.

*Q.* Q. *114*–117. So far as you know, was Olin the first to apply to grain-binders, a device for causing the butts of the grain to be delivered to the binding mechanism, in horizontal line with the heads?

A. So far as my personal knowledge goes he was.

X Q. *115*–118. And your testimony on the direct examination has been given under this impression, has it not?

A. Not particularly. That impression had no special effect on my testimony. I testified under the belief, however, that Olin was the first to apply the combinations which he claims.

X Q. *116*–119. Do you know whether any harvesting machine was ever yet constructed with the butt-evening device over the elevator, and parallel with it as shown, described and specifically claimed in the Olin patent No. 223,812?

A. The defendant's machine before me is such a machine. It has the butt-evener to be sure, on the downward portion of the elevating path of the grain. I don't know of any machine being constructed with the butt-evener on the upward portion of the elevating path just as shown in Olin's drawings.

X Q. *117*–120. You say just as shown in Olin's drawings. How about Olin's description?

A. It is also included in my answer.

X Q. *118*–121. In order to make the defendant's machine infringe the Olin patent, you have to construe the expression pivoted at its lower end to mean pivoted at its upper end. This expression "devices for shifting its upper end," to mean devices for shifting its lower end, and the expression "elevating the butts of the grain" to mean accelerating the downward progress of the butts, do you not?

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A. Not exactly. I construed "pivoted at its lower end" to mean, pivoted at its receiving end; and "shifting its upper end" to mean, shifting its delivery end; and "elevating the butts" to mean, conveying the butts. This is evidently correct mechanically, for if you take the machine and tilt it up so that the butt-adjuster is on a level or on a downward incline and feed grain over it there would not be one particle of difference in its action, and you might take the defendant's machine and take the slotted platform with the
85 toothed arms, the binding mechanism and the butt-evener and put them on the other side of the ground wheel in the position now occupied by the endless elevating canvases, and their operation would then be identical with what it now is, and the location and arrangement of the parts would be within the strictest literal construction of the Olin claim.

X Q. *139*–122. Is the butt-evener on the defendant's machine over the elevating canvas?

A. No, it is over another part of the elevator or elevating mechanism.

X Q. *140*–123. Is it hinged at its upper end or at its lower end?

A. At its upper, or receiving end.

X Q. *141*–124. Do the shifting devices shift its upper end or its lower end?

A. Its lower or delivery end.

X Q. *142*–125. I will ask you again, Mr. Bates, whether you know of any harvesting machine ever having been made as shown and described in the Olin patent.

A. Not exactly like that shown and described. The defendant's and a Deering machine that I have seen are very much like it, or as near as any machines that I know of as having been actually made.

X Q. *143*–126. Do you know whether any machines of the present day have the butt apron parallel with the elevator on the elevating side of the machine?

A. If you mean on the rising portion of the path of the grain I have no actual knowledge of such machines.

X Q. *144*–127. Do you know whether Olin was the first to construct a butt apron traveling independently of the elevator apron, but parallel with the elevator and on the same side of the machine?

A. I do not.

X Q. *145*–128. Where is the device referred to in the Olin patent as the roller I?

A. It is between the carrier platform and the beginning of the elevator.

X Q. *146*–129. Now please look at the specification of the Olin patent and state what Olin says about the relation of that
86 roller to what he calls the elevator belt Q, which is the butt-evener.

A. All that I find is on page 4 from line 94 on, in which he says that the teeth *b* will engage with the butts of the grain on the roller

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I, and also that the lower pulley *c* is so arranged that it will permit the teeth *b* to clear the end of the roller and engage the butts. That is all I see on that point. That of course applies to the specific location shown in the drawings which the specification describes.

X Q. *147*–130. From lines 55 to 60 on page 4 of the Olin specification do you find any statement relating to the length of the elevator Q? And, if you do, please state in your own words what you understand it to be.

A. The paragraph referred to simply states that the butt-evener need not extend the entire length of the elevator. This statement is particularly relevant in view of the fact that in the defendant's machine the butt-evener does not extend the entire length of the elevator.

X Q. *148*–131. But in saying that the belt Q need not extend the entire length of the elevator, where does Olin specifically define that it shall begin?

A. He doesn't say.

X Q. *149*–132. Does he not say the elevator Q need not extend the entire length of the elevator, but may stop some distance below the upper elevator roller, and does he not also say that the lower end of the elevator Q is to be close to and in a certain relation to the lower roller I, and does he say that the lower end of the elevator Q is to be in any other situation or may be in any other situation than the one I have named?

A. In speaking of the combination of the roller I with the butt-evener Q Olin does say substantially that the lower end of Q is to be close to I, but in speaking of his other combinations he, of course, does not put any such limitation on the position of Q, as it obviously does not need to occupy that particular position. He does not actually say directly that Q shall occupy any other position, but he does say that Q can be used with other forms of elevators than the one shown to accomplish the same results. Just what he had in mind in making that statement I don't know. Probably it was some such arrangement as that of the
87 defendant's machine, as the language clearly applies to it.

X Q. *150*–133. Does he say anything about using it with any other form of elevator in any different situation than the one he defines?

A. Not in so many words, but, of course, the difference of location is implied when it is necessary. In the defendant's machine the difference in location is necessary, because the rising portion of the elevator in that machine is forward of two canvas nets, between which the grain is held, and if they were far enough apart to admit the butt-evener they would be too far apart to hold the grain.

Adjourned to Monday morning at 10 o'clock.

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MONDAY, *January* 25, 1886—10 o'clock a. m.

Parties met pursuant to adjournment.

Present: Same as before.

X Q. *151*–134. In the Olin patent now under consideration what is the part marked $M^1$?

A. It is a board under the belts of the elevator and is called the backing board in the specification.

X Q. *152*–135. Is that a fixed board?

A. Yes, sir; I so understand it.

X Q. *153*–136. What are the parts M?

A. They are the belts of the elevator.

X Q. *153*–137. What are the parts *a*?

A. Teeth or slats on the belt.

X Q. *154*–138. Do you find the parts *a* mentioned indiscriminately in the specification as teeth or slats?

A. They are called teeth. They would be slats, however, if they were long enough.

X Q. *155*–139. Then I am right in saying that the elevator in the Olin patent consists of a series of bands traveling upon rollers over a wooden backing and provided with teeth for engaging the grain and carrying it upward.

A. Yes, sir.

X Q. *156*–140. What is the part R?

A. R is a cover to keep the grain within the action of the elevator and butt-evener, and to prevent its being blown away.

X Q. *157*–141. Does it travel or is it fixed?

A. It is stationary.

X Q. *158*–142. What are the parts $S^1$?

88 A. They are arms or fingers which form another portion of the cover of which R is one portion?

X Q. *159*–143. Are they stationary and parallel with the backing board $M^1$ like the board R as far as the backing board extends?

A. They are stationary and parallel with $M^1$ where they are over it. Their ends however, are curved so that they are parallel with the swath throughout their length.

X Q. *160*–144. How many bars $S^1$ would there be in an Olin machine?

A. Three or four or five. The patent does not say how many.

X Q. *161*–145. Suppose that the board R and bars $S^1$ were supplanted by a continuous board, forming a cover between which and the backing board $M^1$ the grain was carried up by the elevator belts. What effect would that have upon the operation of the Olin machine?

A. None at all, that I see.

X Q. *162*–147. In the Olin machine, at what speed does the belt Q travel with relation to the speed of the elevator belts M?

A. It travels a little faster.

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X Q. *163*–148. How many times as fast?

A. As shown in the drawing Q would travel about 25 per cent. faster than M, but this is not conclusive, as these drawings are not made to scale generally.

X Q. *164*–149. Supposing that to be so, would not the butts, when they reached the upper end of the elevator, be higher than the heads?

A. If they started even, probably they would, but as a matter of fact, they do not generally start even. The butts are dragged across the standing grain by the carrier platforms so that the heads get ahead of the butts except in very long grain, and the effect of the belt Q is to get the butts even with the heads again before the grain reaches the binding mechanism.

X Q. *165*–150. Do all the belts M travel with the same speed?

A. Apparently they do, though there is nothing positive on this point.

89 X Q. *166*–151. Would it be possible for the belts M to travel at different rates of speed with the mechanism shown in the Olin drawings?

A. Yes, sir. If the long rollers over which the belts run were larger at one belt than at the other, the belt on the largest portion would run faster than the others.

X Q. *167*–152. Does that condition exist in the Olin drawings?

A. Apparently not, but the drawings have so many shade lines on them that it might be so. My understanding, however, is that all the belts M run at the same speed.

X Q. *168*–153. Is it your understanding also, that each transverse series of teeth "*a*" travels up in a horizontal line?

A. They may or may not. Probably in 99 cases out of 100 they would not. It would depend upon just how the belts happen to be put on.

X Q. *169*–154. In which way is a wisp of grain most liable to catch and be obstructed, when pushed head foremost or in the contrary direction?

A. When pushed on end, head foremost.

X Q. *170*–155. What do you mean by the expression "when pushed on end head foremost"?

A. I mean when given motion in the direction of its length, the head going first.

X Q. *171*–156. Now state please, whether, in your opinion, the combined operation of the toothed butt-elevator belt Q and the toothed elevator belts M, the elevator belt Q inclining at its upper end inward toward the elevator belt M and traveling about one-quarter faster than the toothed elevator belts M, would be to straighten the grain, bringing the belts in even line with the heads, and pushing the short grain head foremost, so that it might be bound at about the middle, or to bend the grain toward the butts and tangle and disarrange it?

A. It would be to straighten the grain, bringing the butts in line

with the heads. It would also act to push short grain back head foremost so that it would be bound about the middle. It might, of course, bend the butts of individual straws here and there, where such projected very much beyond the edge of the swath.

90 X Q. *172*–157. In the defendant's machine are the pulleys and wheels of the adjustable-butt apron arranged with their faces parallel with the upper surface of the main elevator?

A. Yes, sir; that portion of it with which the butt-adjuster is combined. They are not parallel with the other portions of the main elevator.

X Q. *173*–158. You call the deck of the defendant's machine upon which the grain is delivered by the elevator, and down which it slides, the elevator, do you?

A. The deck you speak of together with the toothed packing arms constitute a part of the elevator, as the grain is conveyed by them in its progress from the carrier platform up to the binder mechanism.

X Q. *174*–159. Where is the grain delivered in the Olin machine?

A. At about the point N.

X Q. *175*–160. Does it fall upon a deck there?

A. It drops onto a platform marked P in the machine shown in the drawings.

X Q. *176*–161. Is that platform P part of the elevator in the Olin machine?

A. No.

X Q. *177*–162. Where is the grain bound in the Olin machine?

A. On the platform P if anywhere.

X Q. *178*–163. Does it slide down anything on its way to that platform?

A. It may slide a short distance over the fingers N before it drops.

X Q. *179*–164. Are the fingers N, and the space through which the grain drops, part of the elevator?

A. Strictly speaking, they are part of the path of the grain as it is elevated from H to P. If they were provided with conveying devices it would certainly be part of the elevator. The downward portion of the path of the grain just above the point N in figure 1 is provided with conveying devices, and is unquestionably a part of the elevator.

X Q. *180*–165. Is the butt apron in the defendant's machine arranged with relation to the main elevator as described in
91 the Olin patent, and has its lower end advanced in front of the line of grain travel?

A. Yes, sir.

X Q. *181*–166. Which claim of the Olin patent do you regard as being most clearly infringed by the defendant's machine?

A. I should say the infringement was pretty clear, of all the claims in controversy, though perhaps the defendant's machine

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comes nearer the exact terms and words of the fourth and sixth claims than of the others.

X Q. *182*–167. Is the infringement of the second claim as clear to you as the infringement of the first?

A. Yes, sir.

X Q. *183*–168. Is the infringement of the third claim as clear to you as the infringement of either the first or second?

A. It is.

X Q. *184*–397. Please quote from the Olin specification the portion which says a combination set forth in the fifth claim may be employed in the pivoted end of the device.

A. As shown, the frame or support for the elevator or belt Q is pivoted at the lower end of the elevator frame and has its driving mechanism located at the upper end; but the driving mechanism may be located at the lower end of the belt Q or elevator if desired.

X Q. *185*–398. If the butt-adjuster were thus reversed, would it be necessary that the driving mechanism should perform all the functions of that shown in the drawings of the Olin patent?

A. So far as I perceive it would.

X Q. *186*–399. Do you notice that in the body of the specification the frame *i* which forms an element of the combination of the fifth claim is referred to as the sliding head *i*?

A. Yes, sir.

X Q. *187*–400. Is there any sliding head corresponding to the frame *i* in the actuating mechanism for the butt-adjuster in the defendant's machine?

A. There is a device corresponding to the frame *i*, but it does not slide, and therefore is not a sliding head. Olin's would not be one either if located at the other end of the butt-adjuster, as he suggested it may be.

92 X Q. *188*–401. Is it necessary in the Olin device as represented in the drawing of his patent that the head *i* should be a sliding head?

A. No, for with the device located at the swinging end of the butt-adjuster, the shaft W might be made to slide, and with the device located at the pivoted end, it is unnecessary to have any sliding motion at all.

X Q. *189*–402. Is not the driving mechanism for the butt-adjuster, as shown and described in the Olin patent, contrived with an especial view to adapting it to the swinging end of the adjuster?

A. It may be. It is equally adapted to either end.

X Q. *190*–403. Is it not a fact, that if transposed to the pivoted end of the butt-adjuster, some of the elements of the driving mechanism shown and described in the Olin patent, would become inactive and be mere useless additions?

A. I think not. If that were the case, surely the defendants would not have used them all in the defendants' machine.

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X Q. *191*–404. If transposed to the pivoted end would the sliding head *i* slide?

A. No; but it would be the same device nevertheless.

X Q. *192*–405. Then would not the sliding feature, become in that event, a mere useless addition?

A. The sliding feature would be of course unnecessary.

X Q. *193*–406. As I understand you, the driving mechanism for the butt-adjuster of the Olin patent may, without change, be applied either to the swinging or pivoted end of the butt-adjuster and be operative in either situation; though, when applied to the pivoted end, some features of the construction would not come into action. Am I correct?

A. The first part of your statement is correct. As to the second, none of the features which are mentioned in fifth claim as material to the combination would be inaccurate. I do not call the capacity for sliding, a material feature of the construction; and if it were it might still exist in the head *i* when at the pivoted end, though the sliding would be prevented by the pivot of the butt-adjuster engaging the main frame of the machine.

X Q. *194*–407. Is not the sliding capacity of the head or frame *i* an essential feature of the driving mechanism for the
93 butt-adjuster, as represented in the drawings of the Olin patent?

A. I have already stated that it was not. The shaft W might be made to slide instead of the head *i*.

X Q. *195*–408. But my last question expressly excludes a sliding action on the part of the shaft W, for it refers to the device as represented in the drawings of the Olin patent. Please answer the last question with that understanding.

A. The drawings represent the device as capable of sliding and of course in order to be a sliding device it must slide.

X Q. *196*–409. Suppose that the device in the defendant's machine for supporting and driving the butt-adjuster were substituted bodily for the supporting and driving mechanism of Olin's butt-adjuster as represented in the drawings of his patent, how would the device work?

A. It would work in the same way, so far as I can see.

X Q. *197*–410. In the same way as what?

A. In the same way as Olin's combination, and in the same way that it works in the defendant's machine.

X Q. *198*–411. Would any sliding movement be provided for?

A. It would be capable of sliding.

X Q. *199*–412. How would it be capable of sliding if introduced into the Olin machine as that machine is represented in the drawings of the patent?

A. The frame which connects the two gears would slide upon the shaft just as Olin's frame does.

X Q. *200*–413. Does not the device as represented in the defendant's machine consist of a bearing to support the pulley to be

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driven and the beveled-gear wheel on the end of that pulley, the bearing being provided with flanges whereby it may be firmly bolted to the side of the machine at its upper end?

A. Yes, sir.

X Q. *201*–414. And are not the flanges upon the bearing disposed with a view of obtaining as high a degree of rigidity as possible when the bearing is bolted in place?

A. I presume they are; they ought to be.

X Q. *202*–415. Was it new or old in machinery prior to the date of the Olin patent to drive a pulley by means of beveled gearing?

A. Old.

94 X Q. *203*–416. Was it new or old in machinery prior to Olin's application for the patent under consideration, to mount a pulley in a fixed bearing and drive it by means of beveled gearing; one pinion of the gearing being upon the shaft of the pulley outside the bearing and the other beveled pinion being upon the driving shaft at right angles to the pulley?

A. Old.

X Q. *204*–417. Then the fifth claim of the Olin patent could not well be held to cover the construction defined in my last question, could it?

A. Hardly, as it isn't claimed.

X Q. *205*–418. Please define the features of construction in the defendant's machine, which in you opinion infringe the fourth claim of the Olin patent.

A. The frame of the butt-adjuster, the batt-adjusting belt, the round bar connected to the swinging end of the butt-adjuster by means of the socket on the butt-board, and the lever by which the driver operates upon said driving rod to adjust the end of the belt.

X Q. *206*–419. Prior to the time of Olin's application was it old in mechanics, to have a board or arm hinged at one end, and adjusted to different angles by means of a sliding rod connected to it toward its free end, the sliding rod being operated by a lever?

A. It might have been. I don't recall any instance just now.

X Q. *207*–420. Now define again if you please the features of the defendants' machine which in your opinion infringe the sixth claim of the Olin patent.

A. The butt-adjuster, the mechanism which elevates the grain from the receiving level to the binding level, and the piece of sheet iron with the word defendant on it, which holds the grain down to the action of the elevating or conveying mechanism and the butt-adjuster.

X Q. *208*–421. Is the entire function of the sheet-iron cover in the defendant's machine performed by the board R in the Olin device?

A. Yes, by the board R and the fingers $S^1$. The sheet iron in the defendant's machine prevents the grain being shot out

95 of the machine at the top of the incline; and that is done

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in the Olin by the continuation of the board formed by the fingers $S^1$. I see no other difference between them.

X Q. *209*–422. Suppose that no butt-adjuster were employed in the defendant's machine. Would the sheet-iron cover still be an essential feature of the machine?

A. Yes. So would the board R in the Olin, under the same conditions.

X Q. *210*–423. Why would the board R be an essential element of the Olin machine, if the butt-adjuster were omitted?

A. Because without it, the grain would get away from the conveying belts.

X Q. *211*–424. Would not the fingers $S^1$ prevent that?

A. If they were there they would take the place of the board R and be the equivalent of it.

X Q. *212*–425. Are they not there?

A. They are. The last two or three answers were given with the idea that the cover R extended farther across the conveyor than it appears to do in figure 3. Of course if the board is so narrow as to act upon the grain only in the immediate vicinity of the butt-adjuster, it might be dispensed with if the butt-adjuster were moved; provided of course that there were a finger S near enough to the butts to hold them down properly. There appears to be such a finger in figure 3.

X Q. *213*–426. Have you ever seen an elevator of the kind represented in the Olin patent?

A. Yes, sir.

X Q. *214*–427. What was the width of the elevator belts in the device or devices of that class, which you saw?

A. I don't remember. Probably a few inches.

X Q. *215*–428. Were they more than an inch and a half or two inches in width?

A. Probably not.

X Q. *216*–429. What would you judge to be the width of the elevator belts M in the Olin machine?

A. According to the proportions of the drawings, about two inches.

X Q. *217*–430. Is the elevator belt Q about the same width?

A. A little more. Probably near three and a half or four 96&97 according to figure 2.

X Q. *218*–431. Is the scale of figure 2 different from the scale of figure 1?

A. In the main it is not but the belt Q is shown narrower in figure 1.

X Q. *219*–432. What is the width of the elevator belt Q as shown in figure 1?

A. The same as the belts M, about two inches.

X Q. *220*–433. How wide is the space between the upper edge of the belt Q and the board R?

A. About the same as the width of the belt.

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X Q. *221*–434. How wide is the apron of the butt-adjuster in the defendant's machine?

A. Ten inches.

X Q. *222*–435. Now, suppose a belt or chain two inches in width were substituted for the butt-apron in the defendant's machine, how would the device work?

A. It would not work quite so well as an evener, because it would be necessary to lower the sheet-iron boards some, and that would confine the swath; but for delivering the grain centrally to the binder it would work just as well.

X Q. *223*–436. Then you think a belt or chain two inches in width would be a practical device in the situation of the butt-apron in the defendant's machine, do you?

A. Yes, sir.

X Q. *224*–437. Could the butt-adjuster of the defendant's machine, as used in that machine—that is, over the deck on the binding side, be employed in a machine which elevated the grain by means of an elevator of the character represented in the drawings of the Olin patent?

A. I think it could.

98 Cross-examination by Mr. PARKINSON:

X Q. 294. Referring now to patent No. 272,598, granted to John F. Steward, do you consider that the swinging revolving canvas is an essential element of the third claim?

A. Yes, sir.

X Q. 295. Is it an essential element of the fourth claim?

A. No, sir.

X Q. 296. Is it essential to the combination in the third claim that the board *c* should be self-setting?

A. No, sir.

X Q. 297. Is it essential to the combination in the fourth claim that the self-setting plate should be used in connection with a butt-adjuster device or with a device for moving the butts?

A. No, sir.

X Q. 298. Do you find any curvature in the board in defendant's machine, which you have stated corresponds to the board in Steward's patent?

A. No, sir.

X Q. 299. When the gavel in defendant's machine is in the position to be bound is it still above the end of the plate?

A. No, sir.

X Q. 300. When the bundle-discharging mechanism in defendant's machine commences to act upon the bound sheaf to eject it is the sheaf above the end of the plate?

A. No, sir.

99 X Q. 42. Deering operates under the Appleby patents, does he not?

A. Yes.

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X Q. 43. He operates also under various other patents, in which he has acquired a greater or lesser interest, does he not?

A. Yes.

X Q. 44. Is his company a member of any so-called pools?

A. What do you mean?

X Q. 45. I mean any so-called pools in which various manufacturers are licensed to operate under certain patents owned by the pools.

A. No.

X Q. 46. Is the Deering Company a licensee under any such pools?

A. No. Suit was brought by the Gorham pool against Deering. Before any move had been made, however, he became pos-
100 sessed of equitable rights under the Gorham patents, and the matter was settled, he relinquishing his rights for a shop right for the future, and all claims to the past. From one point of view, it may be said that he has a license under the pool; from another point of view he acquired his rights wholly independent of the pool, in purchasing all of the interests held by one of the heirs to the Gorham estate, namely, one-third; he bought his peace by settling the matter, assigning them his rights and taking a full release from them.

X Q. 49. At the time when, as you say, you went to Mr. Search and suggested that he make an application to you, and go into interference with Webster, what claim did you understand
101 that Mr. Search was making with respect to this invention?

A. His claims were solely confined to the device, Webster 1884 patent knotter. I asked him for the full facts, and he gave them, apparently freely, and stated them to be the full facts. He thought that in doing the work which fell upon him, he had accomplished something calling for something more than the skill of a mechanic; he did not claim that the arrangement of the parts was solely or in part, his, but that he had proportioned the gears, the pinions and the screws, as well as the knotter frame, a thing which, he stated, that Webster could not have done, and which I readily admitted that, although he was an ingenious inventor, he could not do.

X Q. 50. Did Mr. Search claim to be a joint inventor with Webster as to this 1884 patent knotter?

A. I think that he was not definite in that respect excepting that the work that he did arose to the dignity of an invention. He would not join Webster in applying for the second patent, and hence, I inferred that he claimed to be the sole inventor of something, therefore I suggested to him to submit the matter to the Patent Office for arbitration, by filing an application.

X Q. 51. I suppose, that as a patent solicitor of experience you understand very well that unless he claimed to be a sole inventor he could not file a counter application and go into interference with Webster, did you not?

A. Certainly.

X Q. 52. And based upon the representation, you so advised, did

you not? That is, advised him to make application and go into interference.

A. Yes.

X Q. 53. When did you first see the wooden screw which has been offered in evidence?

A. I cannot give the date, but it was about the time that we learned that the Winona Harvester Works were building, substantially, our knotter. I then made inquiry about the factory, and gathered up Exhibit Webster 1883 patent knotter, the iron screws and such other parts as might have a bearing upon the case, among them the wooden screw. This was handed me by Mr. Deering, or by Mr. Webster, I cannot say which, but I do remember that whichever it was, stated that he found it among papers and other things in his drawer.

X Q. 54. Were you active in conducting the investigation
102 in the factory in the early part of 1883 with a view to determining the relative rights of Mr. Search and Mr. Webster?

A. I think you mistake slightly, it was not so much an attempt to determine the relative rights as it was to determine what facts and to accumulate such facts as would enable the matter to be settled by the Patent Office. I reported duly to Mr. Deering that he might know. I was certainly diligent in this matter.

X Q. 55. You did not see this wooden screw at this time, did you?

A. No.

X Q. 56. Who made the patent of the drawings for the two Webster patents?

A. John B. Kaspari, then and now my draftsman.

X Q. 57. In the fall of 1882 was there any lathe in the Deering factory adapted for such adjustment as to cut a $\frac{5}{8}$ thread for the screw?

A. That I cannot say, but will state that the gears on lathes of different manufacture will sometimes interchange so that a thread can be cut entirely different in pitch from any that the lathe was originally designed to cut. Immediately after the adoption of the knotter the screws were cut on several lathes in large quantities, but I cannot say whether said lathes were adapted or not.

TUESDAY, *Dec.* 20, 1887.

Said parties met pursuant to adjournment.

Present, as before.

JOHN F. STEWARD recalled, sworn and examined on the part of complainant, deposes and testifies as follows, in answer to questions by Mr. BANNING:

Q. 1. You are the same John F. Steward who has heretofore testified as a witness in this cause, are you not?

A. Yes.

Q. 2. Please state what experience you have had in connection with harvesting and grain-binding machinery, or patents relating thereto, and whether such experience has been practical, theoretical, or both.

A. My practical experience, I think, I have already given when previously testifying, my theoretical experience has extended through the last 22 years, since I began taking
103 & 104 out patents for my own inventions; having prepared, and aided in preparing such applications. For the last 12 years, in addition to my labors in inventing, perfecting and preparing sample machines to be copied for putting them onto the market in large quantities, my duty has been to consider inventions, both as to their practicability and novelty, with a view to patenting and adopting. All inventions submitted to the company which employs me, are referred to me for consideration. We receive, I think, on an average of about three letters, or personal interviews with inventors, per day; this would be nearly 1,000 per year; in the last seven years nearly 7,000. All such inventions I have considered, with a view to purchasing them, if I found them novel, and in these considerations, the question of patentability and scope, or breadth of claims that might be founded upon them, have been an important item. I have testified as an expert, practically and theoretically in several cases, relating to harvesting machinery, that being my chosen art, the art to which I have devoted my entire business life, namely, from the close of the war to the present time. My practical experience, I think, I have already given. Not now recalling whether I have done so or not, I will say, that in reducing my own and the inventions of others to practice I have constructed and aided in the construction of very many new machines and said construction has been followed by tests and practical operation in the field, which have taken me into the harvest field every year for from one to five months, excepting, as I should have before said, two years, part of which I was in the employ of the Government in a scientific capacity. My experience has been such that I should have, and I trust that I am warranted in answering that I do have, a clear knowledge of both the intricacies of harvesting and grain-binding machinery and a knowledge of the art in a broader sense.

105 Q. 9. Have you examined the Wm. F. Olin patent of January 27, 1880, number 223,812, sued on in this cause, and do you understand the invention therein described and claimed?

A. Yes, as to both parts of the question.

Q. 10. Have you also examined the references offered by the defendants against said Olin patent, to wit, the Elward patent of July 6, 1875, number 165,316; the Elward patent of May 9, 1876, number 177,231; the Green patent of March 6, 1877, number 188,125; and the Watson & Renwick patent of 1853, and do you understand the constructions shown and described therein respectively?

A. I have repeatedly examined them and do understand them.

Q. 11. Have you also examined the testimony of Henry B. Renwick taken by the defendants in this cause, and do you understand the views and positions therein suggested or expressed?

A. I have made a very careful study of that testimony and feel confident that I understand it.

Q. 12. Please explain what you understand to be the Olin inven-

tion described and claimed in said letters patent number 223,812, and state whether or not you find such invention shown, described or disclosed in any of the prior patents offered by the defendants, and whether or not, giving to them all proper effect, said prior patents can operate as limitations to take or put the construction employed in the defendants' machines in controversy outside of the true scope and meaning of Olin's claim, giving your reasons fully for any opinions you may express and pointing out wherein you may differ from the views, theories or positions suggested by Mr. Renwick.

A. The question is so comprehensive that I will, in so far as I can, divide my answer topically, first considering the Olin patent. In the patent I find these words: "In that class of harvesting-machines where the grain is received upon a carrier platform, and elevated over the drive-wheel by an elevator and delivered to the
106 binders, or an automatic binder, it is," (as stated in the clause before the statement of invention) "desirable" that certain things be accomplished, as follows:

"That there shall be no stoppage in the flow of the grain in its passage to the place of delivery."

"That the butts of the grain shall be carried up parallel, or nearly so, with the heads of the grain so as to deliver the grain in proper shape for binding."

"And that the grain shall be delivered to the receiving table so that it can be bound at or near the middle" of its length.

Seeming to me, as it does, that the proper construction of the Olin patent can only be given with certain things in view—things which I have quoted—I have emphasized certain of the words included in the quotation. The Olin invention is clearly intended to be an improvement in the class of machines which he states elevates the grain from the receiving platform—which is on a comparatively low level—and deliver it into a binding receptacle; so that it may — bound manually, or by means of an automatic binder.

An automatic binder is a piece of mechanism which performs certain offices, and the receptacle of an automatic binder is that place wherein the grain is accumulated in the form of a gavel and encircled by the band material, and from which the completed bundle is thrown to make room for a succeeding one. It does not seems to me that the Olin patent has been considered fairly by Mr. Renwick, because he has given no clear understanding as to what the binder receptacle is.

The Olin patent shows clearly an accomplishment of all these things which the inventor states are desirable, one of the most important ones, of which is, the actual delivery of the grain into the receptacle.

Another is, that there shall be no stoppage in the flow of the grain. I take this to mean that there shall be nothing to obstruct the flow, or that some precautionary measure should be taken to overcome any inherent causes of stoppage, "in its passage to its place of delivery."

"Place of delivery," I take to mean the binder receptacle.

In view of the fact that in nine-tenths of the field of grain
107 cut, the butts of the straws are retarded by brushing contact with the standing grain. I take the words of the patent, "the butts of the grain shall be carried up parallel," to mean that it is desirable that some mechanism be provided for advancing the butts of the swath of grain, in its passage from the receiving platform to the binder receptacle, more rapidly relatively to the movement of the heads of the straws forming the swath. The purpose of this being, to put the swath of flowing grain in better shape, so that when delivered into the binding receptacle the gavel will be in better condition, and hence, contribute to more perfect work; that is to say, to a more perfect result—to a more perfect completed bundle. I may say further, to more perfect operation of the automatic binder or the manual binding operation, because of an easier and more perfect separation of the completed bundle from the flowing swath.

The third desirable thing to be accomplished, is "that the grain shall be delivered to the receiving table so that it can be bound, at or near the middle."

I do not construe "to the receiving table" to be merely something located anywhere, but to be, the "receiving table"—the place where it is "delivered to—an automatic binder"—the particular position where the grain remains while the operation of binding is performed. Such is the binder receptacle, which I have defined. Before considering the offices performed by the devices which Olin has provided, I will, in order to make the matter perfectly clear, as I hope to do, first, show the conditions of grain that must be operated upon by an automatic binder, or a manual binder.

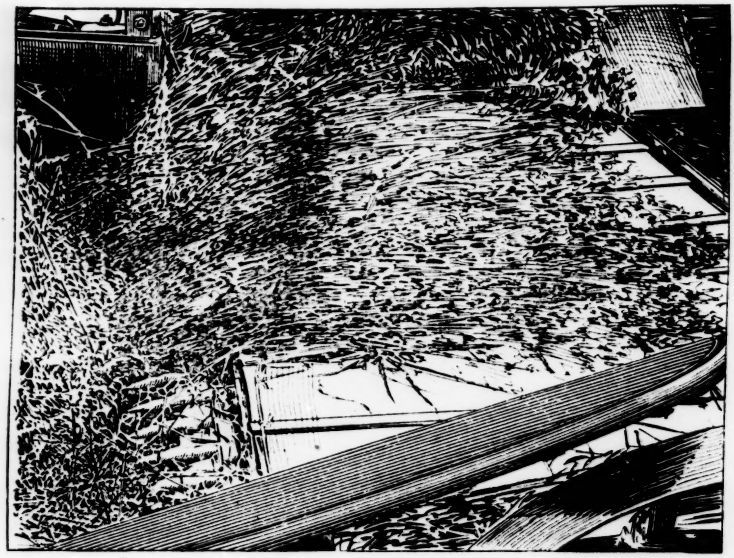
In a field of grain with standing straws, while being advanced upon by the cutting apparatus, in order that it may fall backwards, it is in fact leaned backward by the real. While thus leaning, the straws are clipped and begin their descent (and there being nothing to support the butts) in the direction of their length, as well as backward. This causes them to protrude into the standing grain.

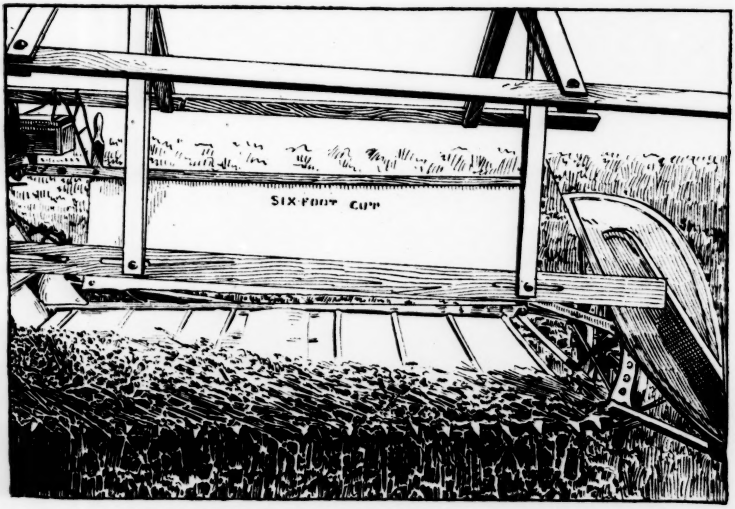
I have prepared photographs which I will produce, which shows the projection of the straws forward of the cutting line; this photograph shows the machine to have been operating in grain heavy on the ground, and so heavy in the swath on the receiving platform, that little turning effect is produced. The machine was
108 stopped and one part of the grain removed without disturbing the other part, solely for the purpose of showing the position of the butts relative to the cutting and delivery apparatus.

This photograph, I will produce, (it now being at my office) and will have marked by the notary, Complainant's Exhibit Photograph Showing Position of Butts Relative to Cutting Apparatus.

In all conditions of grain, except that very long and very heavy, the brushing contact of the butts of the swath with the standing grain, is such as to cause the butts to lag behind. They are held by the standing straws while the heads are being moved by the conveyor, until the angle of the straws in the swath, relative to the line of its travel, is such that the butts slip by the obstructions.

In order to make this matter clear, I have prepared a photograph which is marked, "Complainant's Exhibit Photograph Showing Angular Position of Straws while on Platform."





In preparing for this photograph, the machine was stopped in its work, and the horses carefully backed out of the grain, and the photograph taken without a straw being disturbed. This is not an extreme case, but is an average case.

I take this condition of the swath to be that which Olin seeks to improve by the use of devices, by which "the butts of the grain shall be carried up parallel, or nearly so, with the heads." The impossibility of doing perfect work in a swath of grain which would flow over and pitch head first into the receptacle as this would, is apparent.

Referring to these photographs it will be observed that the positions of the butts of the straws relative to each other is not uniform, some of the straws, in fact, do project six inches beyond others. In order to bind the straws in the middle, it is necessary that the butt of the bundle, as formed by the straws, shall be uniform. By acting upon the butts directly, or squarely against them, the butt of the gavel is shaped.

"The object of the invention," says Olin, "is to provide devices for attaining all these results," and I will now consider, broadly, what is attained by the devices which he provides.

Grain, often in the same field, varies much in its length.

It is desirable that the grain be bound somewhere near the
109 middle of its length. Whether at or near the middle, cuts no figure as long as the band is applied so near the centre of gravity of the bundle, that it can be handled conveniently in shocking and stacking.

Prior to the date of the Olin patent, various forms of conveying and elevating devices were known, the operation of such being to convey the swath of grain in a continuous stream or "flow," as Olin says.

To facilitate this flow, (elevating, as it is also sometimes termed in the patent) to the place of delivery, Olin provides the devices which have been so often described in the record of this case, and particularly, and incorrectly, described and considered in the testimony of Renwick.

Forward, relative to the line of travel of the butts of the grain, is pivoted a swinging frame; this frame extends along the plane over which the grain travels. At the pivoted end of this frame, which is the receiving end, is a pulley. At the delivery end of this frame is also another pulley, which is driven by gearing, adapted to rotate it when in any position which it may be placed when the frame is rocked on its pivot. Around these two pulleys is thrown a belt, provided with projections which shall give it aggressive contact with the butts of the grain. The swath of grain, while being conveyed from the receiving platform to the binder receptacle moves over a path irregular in outline as compared with the horizon, but a plane at some portions—not a horizontal one, however. The butts of the straws present a front, so to speak, which is attacked and acted upon by the aggressive belt which I have mentioned. This belt, as stated, is adjustable at its delivery end, so that in short grain, by rear adjustment of the swinging frame and its belt, the whole swath

may be changed in its direction of movement headward, so that when it reaches the binder receptacle its middle will be more nearly where it should, for central binding. Not only this, the action of the face of the belt, (lettered Q) by actual pressure upon the immediate ends of the straws will press those which project further forward to the position occupied by those furtherest rearward. This has the effect of making even, what is to be the butt of the bundle. In order that the butts of the grain shall be brought parallel,
110 or nearly so with the head of the grain, the belt Q is given an onward movement more rapid than the mechanism for advancing the other parts of the straws. The patent does not state definitely how much faster, but I find upon referring to figure one, of the drawings, that the increased speed does not differ much from 25 per cent. Means, which I will shortly consider, for adjusting this belt to correspond to the requirements of different lengths of grain are provided. While, as the patent states, the belt Q can be used with other forms of elevators, it is, perhaps, best to consider the particular elevator used by Olin. This is a series of belts drawn round driving drums, and provided with teeth that shall give them sufficient contact with the grain to move it. In order to deliver the grain well into the binder receptacle, a roller L is placed beneath that lettered K, and the belts are thrown around the two and the roller J. By this construction, Olin provides a conveyor which may act as an elevator to carry the grain over the supporting wheel, and at the same time depress the swath and deliver it well into the binding receptacle. I treat this device both as a conveyor and as an elevator—a conveyor, because it carries the grain from one point to another; an elevator, because the place to which it is carried is higher than that from which it is moved. In the sense of the Olin patent, and in the light of the art, these terms are strictly synonomous. I do not wish to be understood as saying, that specific constructions of devices do not exist in the art in which it is not proper to distinguish between a conveyor and an elevator. I think I am borne out in my broader statement by the fact, (as I consider it to be a fact) established in my mind by long experience, that it is totally inessential to the operation of the Olin device, whether the mechanism for moving the grain be considered, or is in fact, something which carries the grain upward, or carries it downward, or moves it horizontally. But one thing is essential; that the grain operated upon by the belt Q must be in a moving, or, as Olin puts it, a flowing condition while operated upon by the belt Q.

Great stress has been laid, by Mr. Renwick, upon what he considers to be a limitation of the Olin patent, namely, that in some of the claims the belt Q is said to be "pivoted at its lower end."
111 A careful analysis of the principles involved in the machine, will show that Mr. Renwick is not sound. As placed in the Olin machine, the belt is pivoted at its lower end. This is simply because it is placed upon such a part of the conveying mechanism that the receiving end is lower. As I have stated, it is immaterial which end is lower, but one thing must not be forgotten, namely, in order to be operative at all—in order to be some-

thing more than an inert mass of machinery, the device must be pivoted at its receiving end. Olin uses the word lower—as shown, it is the lower, but it is also the receiving end. Hinged at its delivery end the device would be inoperative, because, with the delivery end in a fixed position, the position of the straw relative to the receptacle could not be controlled or adjusted. As this matter has been overlooked by Mr. Renwick, and as much dust has been stirred up which tends to obscure it, I will dwell somewhat upon it.

Olin's adjustable belt Q is a device by which the direction of the travel of the swath of grain is controlled. If left in one position, the swath travels in a straight line (as in long grain), from the farthest end of the receiving platform to the binder receptacle. If the operator wishes to deliver his swath to another position,—to give it another course, another line of travel, he moves the belt Q.

I can liken this to the means by which railroad trains are given different direction of travel; if an ordinary three-way switch is left in one position, the train passes straight ahead; if moved one space, the train is given a different direction; if moved still further the train will be carried further to the right or the left as the case may be.

Olin's device I consider to be one, that, among other things, renders it possible for the operator to switch the swath of grain onto any track he pleases for the purpose of central binding.

A railroad switching arrangement is something which at the point of divergence operates to cause the paths to diverge, and the divergence must necessarily take place at that point.

The point of divergence of the swath of grain in the Olin machine must necessarily be that at which the aggressive action of the devices which produce divergence begin-, namely, at the receiving end. In my railroad illustration the tracks diverge
112 from a point to which the train is tending. Also in Olin's device the different paths through which it is possible for the grain to travel, diverge from that point to which the grain is tending.

I have dwelt upon this to show what seems to me to be the ridiculousness of Renwick's position that upper or lower, as terms, cut any figure.

As great stress is laid on the fact that while Olin's device is pivoted at its lower end, defendants' is pivoted at its upper end, I will carry my railroad illustration a little further. I once had occasion to take the Pennsylvania railroad which goes over the Allegheny mountains to reach Williamsburgh, in that State. We were switched off onto a branch road, but I do not now recall whether such divergence took place while we were ascending the western slope or descending the eastern. In fact, it made no difference, for I arrived, duly, at Williamsburgh.

In the Olin machine the grain is caused to pass over a higher elevation (to surmount the drive-wheel) than the receiving platform from which it comes, to the binder receptacle where it is delivered, and as a matter of fact, by personal knowledge, it makes no difference where the diverging point is located because it invariably

reaches the binder receptacle in the condition and in the position desirable for proper binding.

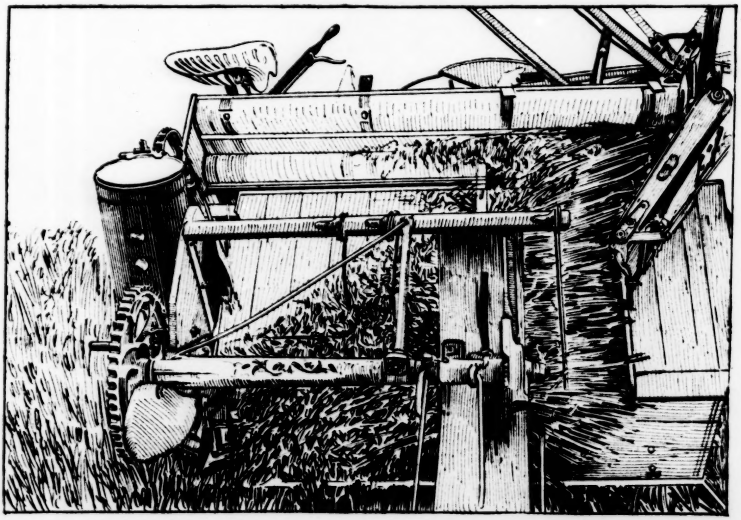
I am speaking from experience when I say that it makes no difference whether the adjustable belt is on the incline or decline. I mean in kind, there is perhaps a very slight difference in degree which makes the Bullock & Appleby position of the adjusting belt the subject of a valid patent, which I will shortly consider.

I am familiar with the Buckeye down binder shown in Defendants' Exhibit Aultman, Miller & Co.'s Low-down Binder, having witnessed its operation in the field many times.

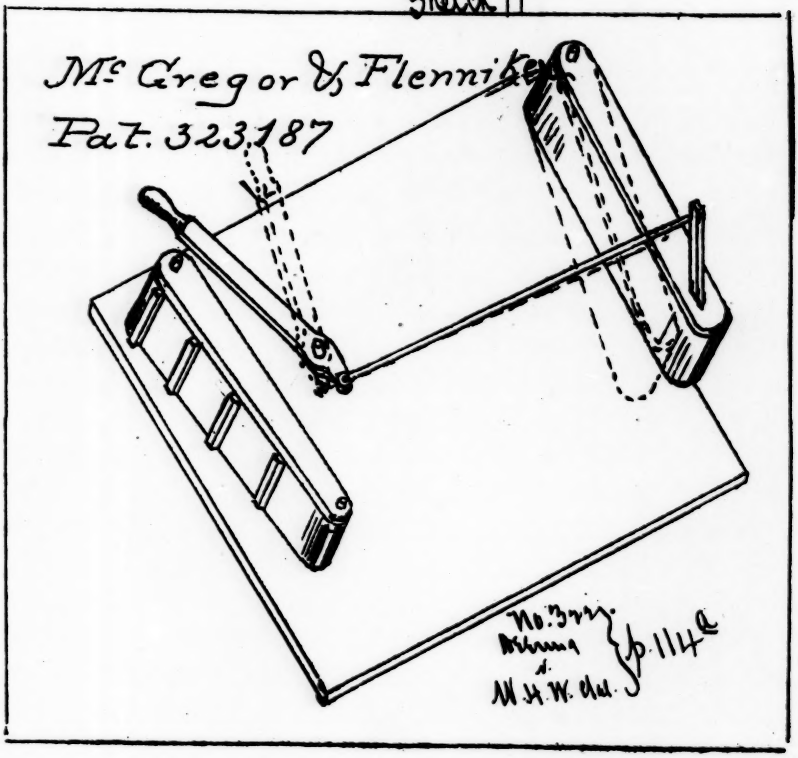
It has been my practice to make a particular study of the different machines put on the market, and this one, the Massy and the Empire binder have received careful consideration. I have driven them repeatedly and watched the action of the swinging canvas upon the grain, the latter being plainly in sight.

The action of the adjustable canvas on machines like defendants' has been almost constantly within my range of observation. This is my chosen art, it is my sole study, all of my practical ex-
113 periences in my business life have been within it, yet, aside from a slight difference in degree, I must acknowledge that I am unable to see any difference in the action, or any difference in the result.

My opinion is founded upon simple facts, and it is not easy for me to give reasons why there are no differences in the devices and their operations. While I can sometimes give reasons why things are different, it is not easy to say why two apples grown on the same tree are alike; the fact that one is borne on an erect limb, and the other on a drooping one, produces no visible effect, any more than the fact that Olin's butt-adjuster is on an erected portion of his conveyor, and defendants' on a drooping portion.



Sketch 11



Sketch 12

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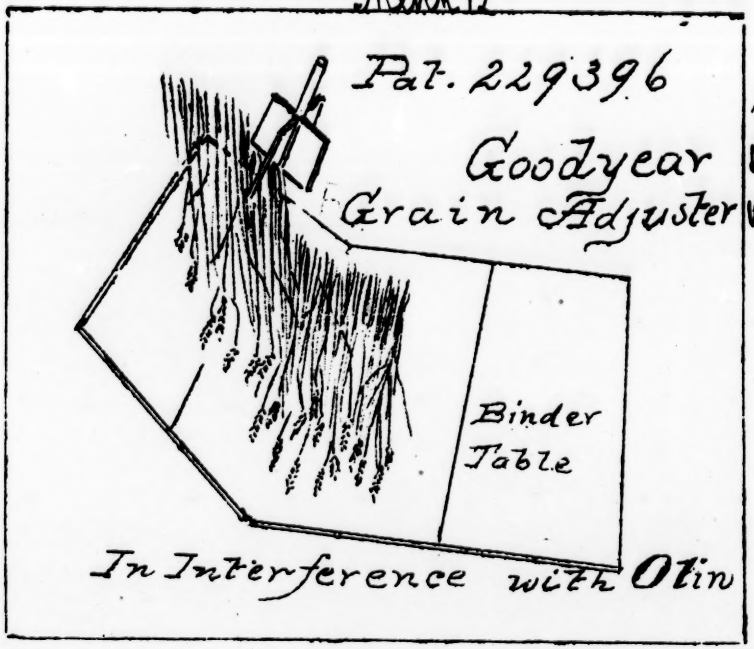


No. 322.
Deering
W. H. W. Hall
p. 114b

In order that I might be able to show the action of the adjusting belt upon grain which is brought to it, I carefully prepared a photograph, (of plaintiff's machine) with the grain cover, (the equivalent of Olin's board R,) removed, which I marked "Plaintiff's Exhibit Showing Position of Straws Relative to Adjusting Belt." It will be observed that in this photograph some of the butts are still held by the elevating device proper, others, the heads are just thrust out. The angle of the straws, before they are acted upon by the adjustment belt, is seen at the top. The parallelism and ali-nment of them, as well as the headward position to which they are shifted for central binding is shown.

While no automatic binder is shown in the Olin patent, the receptacle for such a device is shown, and he states, particularly, that his device is designed to be used as part of an automatic binding machine, so that I think I am warranted—clearly, even if for no other reason—by the fact that he provides mechanism for delivering the grain directly into the receptacle, in saying that a very broad construction may be given his devices.

With the state of the art in mind, which I shall soon consider, I am clear in my opinion that Olin is entitled to a construction as broad as this; an elevated platform for receiving the grain, means for placing and securing the band around the bundle, and a rotating adjustable device for determining the position of the band around the stalks of grain.

Or a construction as follows: An endless belt moving in the direction of the grain delivery, operating in contact with the end of the grain to deliver it to a binding mechanism: or entitled to a
114 claim covering an endless belt in a swinging frame, and moving in the direction of the grain delivery, operating upon the butts of the same, and adjustable to regulate the direction of delivery, and thus the placement of the band relative thereto.

I deem Olin's claim, as drawn, when properly construed, to show no limitations, but to be entitled to construction as broad as I have supposed. Patents, subsequent to Olin, have been issued to Bullock & Appleby, to Albert Goodyear, No. 229,396, and to McGregor & Flenniken, No. 323,187, which have grain-adjusting devices, especially the Bullock & Appleby and McGregor & Flenniken, which show defendants' position. The patent to Goodyear is not clear, but a sort of an adjustable paddle wheel is shown for advancing the butts of the straws, and placing them in position for central binding. I have prepared sketches illustrating the particular parts which I am considering, of the McGregor & Flenniken and Goodyear devices, which I will call sketches 11 and 12, respectively.

(Here follow diagrams marked pp. 114*a* & 114*b*.)

I will now consider the Olin patent, in view of the state of the art, simultaneously, with my consideration of matters set up in the answer, and Mr. Renwick's testimony.

In the patent to Weston & Renwick is shown a grain harvester and automatic binder. As in the Olin machine, the grain is con-

veyed in the form of a continuous swath. A series of belts form the elevator, and by means of a longitudinal movement of the uppermost roller, or rather, the shaft which carries them, the delivery ends of these belts are adjustable more or less rearward, to deliver the grain centrally onto a table. This patent provides for delivery for central binding, but that is all that it does provide. Nothing is shown or described for pushing the individual straws forming the swath headward by actual contact with the butts, and thus evening up the butts, and bringing them uniformly into line. No means is shown for hastening the butts, in order to bring them parallel with the heads. A main elevator is shown—it is the only elevator—only device for conveying the grain to the binder. This patent can in no way limit Mr. Olin, because all of his claims involve combinations of parts, that do shift, relative to the conveyor. A conveyor device which shifts, cannot anticipate a combination of something which shift with another conveying device that does not.

115 Even if such were not true as I have stated, the Watson & Renwick conveyor does not hasten the butts, nor does it push the straws endwise, and thus even the butt.

For the above reasons (given in the second sentence before this one) claim two is not met. The same as to claim three of Olin. Olin's details of construction being so dissimilar, I find no similarity in the arrangements and combinations forming the subject of Olin's claims four, five and six.

The Watson and Renwick method may be found in letters patent to Gorham, Gammon and others, none of which have been offered in evidence.

I consider the Watson & Renwick as in no way limiting the Olin patent. If Olin's claims were so broad as to cover all devices for shifting the swath, the Watson & Renwick would then be a limitation.

I have considered this Watson & Renwick patent before beginning my consideration of Renwick's testimony, in order that his discrepancies may be made more visible. In the printed record before me, I find an error in one of his quotations too grave to pass, beginning with the third line on page 349, he says, regarding Olin's statement of invention, that the invention consists "in providing a belt or chain at the grain side, that is, the side furtherest from the deck, and not over it, of the machine for elevating the butts of the grain." Not only is "grain side" emphasized, as is not the case in the patent, but in the quotation is the following interpolation—he puts these words into Olin's mouth, regarding the location of his belt or chain, "that is, the side furtherest from the deck, and not over it." As Mr. Renwick's conclusions are founded largely upon this error, and largely upon his failure to understand the Olin patent, and because of his apparent unfamiliarity with the art, I call particular attention to this interpolation, and urge a cautious consideration of other matters which I shall point out. I do not find in the Olin patent anything that can be considered a limitation, much less do I find that he says, that the elevator shall be located on the side of the machine furtherest from the deck, and not over

it. On the contrary, he says, "the elevator of belt Q can be used with other forms of elevators than the one shown, to accom-
116 plish the same results." At the time of the Olin invention, defendants' elevator was a common form, having been put on the market for years in large quantities. That the Olin belt Q was applicable to that form of elevator is shown by defendants' machine. Olin shows and described what he considers to be a practical way for practising his invention. Nothing more could be expected from him, any more than, perhaps, to suggest that it was but the work of the mechanic to apply it to other forms of elevators, hence he mentions that it may be so applied.

Olin does say that his belt Q is pivoted at the lower end. Unaccompanied by any other assertions, this is not a limitation. For illustration, the door which enters this room, is a plane of wood of certain dimensions, pivoted at one of its vertical edges by certain contrivances known as hinges, said hinges being upon the left-hand side, upon the right-hand side is a knob for operating a latch. In another wall of this room is a plane of similar dimensions made of wood, with hinges identical, and with a latch and knob, but the hinges are on the right side and the knob on the left; if the first of these things is a door, the second is a door, absolutely a door, notwithstanding the fact that there is an exact reversal of the position of the hinges. Renwick might just as well say that there is a difference between those two doors as that there is a difference between Olin's device, which is in fact hinged on the grain side, and defendants' device which is hinged on the stubble side. Certain functions are peformed by Olin's part Q, because it is an "elevator," as he shows. I say, more properly, conveyor. Other functions are performed because it is a belt, a moving plane surface made to have aggressive contact with the butts of the grain. Olin speaks repeatedly of this as a belt, calls it an elevator or belt, and nowhere limits himself to it as an elevator.

On page 349 Mr. Renwick lays great stress upon phrases which he claims to have found in the patent to show that Olin limits his location to the ascending portion of the elevator. As a matter of fact, Olin does show it in that position and hence, speaks of it in his description as being in that position, very properly, the same as I have described the door as being hinged upon its left side because that is where it does hinge. By the nature of the device Olin is limited to placing his belt so that it shall be so nearly along the plane upon which the grain moves as to operate upon the
117 butts. Turning to the Olin patent it will be observed that his elevator does not end at the uppermost point, but that its operating teeth descend far toward the binding receptacle. In sketch number five this construction is shown and the path of grain travel is illustrated. A plane extending between the two uppermost rollers is shown, over which the grain moves. Now, turning to sketch number seven, the belt is there shown, and in this sketch we find, by mere change of position, without change of function a construction conforming strictly to the claims one, two and three of the Olin patent, (reading into these claims for the moment) Olin's

statements that the driving mechanism may be located at the lower end of the belt Q—(receiving end in fact).

Mr. Renwick attempts to show that defendant's machine differs because of location of the parts. I trust that sketch seven will be considered as coming within the Olin patent, and hence, that I am warranted in saying that sketch five showing the path of the grain in the Olin patent and defendants' machine and the devices which move the grain in said path is a correct illustration. I do not admit, but trust that I have already shown that it is not necessary to show that the Olin elevator is at, the same time a depressor as shown in sketch five, in order to make it cover defendants' machine. But I have touched upon this matter in an endeavor to make it plain, that defendants' position, and Olin's position as shown are both substantially the same, that is, not merely positions relative to the horizon, but relative to the co-operating parts with which they are in each case combined. Olin carries the grain up over the wheel and carries it down into the binder receptacle, defendants' machine, as shown in sketch 5 does the same thing, their mechanism, however, for depressing the grain on the decline side, being, instead of an actual moving part of the elevating device, moving parts supplemental thereto. There is this distinction, sure enough between complainant's patent and defendants machine, but it is a distinction without a difference. Suppose for a moment that Olin were limited, to the position shown, we would have an operative combination of devices which would operate to produce the desired result. In defendants' machine, notwithstanding the change of position, we have the same elements forming a combination which performs the same office.

118 So far there is no difference. There is this distinction, however, while in Olin's case the elements of the combination operate simultaneously, and in defendants' device consecutively, (for the moment ignoring parts of the conveying devices which cause the downward movement of the grain) yet the results are the same.

On page 351, Mr. Renwick complains of insufficiency of description in the Olin patent. I cannot deny, in fact I am forced to conclude that it must be true, that the specification is insufficient to make the matter clear to him, else he could not have made the mistakes he has in considering the patent. To one versed in the art, however, it seems to me nothing could be plainer. He introduces a model illustrating the Olin invention, and I deem it proper for me to call attention, not only to the inaccuracies in it, but to an error in the construction, which, were it not pointed out might lead to great injustice toward the plaintiff. Mr. Olin states distinctly that his belt Q should move more rapidly than the conveying mechanism, so as to bring the butts to a position parallel with the heads, and his drawings show that the pulley which drives the belt Q is 25 per cent., or thereabout, larger than the drum which drives the conveying device, or elevator. In the model the pulley which moves the belt Q is fully 25 per cent. smaller than the roller which drives the elevator, this is a distortion so serious as to more

than defeat the operativeness of Olin's machine. Still another error is found, which taken in connection with Renwick's explanation becomes grave.

Adjourned till January 3, 1888, at 10 o'clock.

JANUARY 3, 1888—10 o'clock a. m.

Met pursuant to adjournment.

Present: Thomas Banning, Esq., for complainant and P. C. Dyrenforth, Esq., and J. G. Parkinson, Esq., for defendants.

Witness resumes:

In consideration of Olin's board R, Mr. Renwick errs gravely, and his error being such as to tend to belittle the Olin invention, in that he treats the board R as a device already known to the art, and hence, ignoring any invention in producing Olin's adjustable belt, no invention was required in placing an old board to operate therewith. He speaks of the same being found in the Watson & Renwick patent. This is not true, nor could it be true, be-
119 cause Watson and Renwick show the grain carried up by and between swinging belts simply, thus requiring neither rods nor Olin's special board. Even if Watson and Renwick did show the rods and board R, I do not consider that their patent would be any limitation to Olin's, because the gist of the latter invention consists of something that is neither suggested, shown nor described by them. On the model, Defendants' Exhibit Model of Olin's Patent, is shown the board R, and at the rear of the machine is shown a similar board. This board is not shown or hinted in the Olin patent. I speak of it particularly for the reason that, from considering Renwick's testimony, the said board, as well as the board R, might be thought to be in connection with the rods S, but the usual form of elevator, or conveyor cover. As a matter of fact the rods $s^1$ were old at the time of Olin, but not so with the board R. The specification states particularly that the board R is designed to hold the grain in contact with the belt Q. Defendants' model shows it too narrow, and placed too far forward to perform that office. Mr. Renwick complains of insufficiency of the specification, and states: "That the model-maker has produced, by the exercise of some little ingenuity, a contrivance which will cause the butt elevator to work at an angle at which it may be set." I recognize in this respect a slight amount of ingenuity, but it was displayed in making the model different from the drawings. Figure 6 of drawing and the specification show that the guiding part $t$ is secured to the board $M^1$. The patent speaks in a language clear to the perceptions of one versed in the art—if not to his, the fault is not with the patent.

Mr. Renwick states: "No office or duty to be performed by the board," (R) "is described in the patent." I find on page three of the patent, lines 22 and following, a clear statement of the purposes for which the parts are provided, and those words: "The board R is located over the belt or elevator Q, and is so arranged as to keep the butts of the grain down," &c.

Mr. Renwick goes on showing what he considers to be limitations to the Olin patent. I have purposely omitted the consideration of such possible limitations intending to so do, while criticising his statements and conclusions. Renwick says—page 352: "The first claim of this patent, as I understand it, refers to a combina-
120 tion of an ordinary elevator on the grain side of the machine."

I take issue with him on the ground that there is nowhere to be found in the patent anything which limits Mr. Olin to that position. His statement of invention and the clause before it are bristling with sentences and phrases, which state broadly what he purposes doing. As a matter of fact, referring now to figure one, he does show his belt Q located upon the grain side of his machine, and it is pivoted at its lower end, and swings at its upper end, and it is driven at its delivery end and adjusted by means which control it at its upper end. He has shown this all clearly in the figures, and has described it clearly, as it seems to me, using such words as will make clear the construction and operation of his device as he shows it.

I urge that the word "lower" is proper, because, as a matter of fact, that end is shown as being lower. He might have gone on in his description, as an attempt to make clear a thousand things not shown in the drawings, in the matter of arrangement, inclines, declines, and all that, but such descriptions, instead of being in such clear and exact terms as to enable one versed in the art to understand the invention, would but befog. He shows one way of using his device, and describes what he shows. At the foot of column one, page three, Olin states: "The elevator of belt Q can be used with other forms of elevators than the one shown, to accomplish the same results, the belt being so arranged in relation to such elevators, as to run with its edge parallel with the upper face of the backing board or elevator."

As shown, the frame or support for the elevator or belt Q is pivoted at the lower end of the elevator frame, and has its driving mechanism located at the upper end; but the driving mechanism may be located at the lower end of the belt Q or elevator, if desired.

Mr. Renwick lays great stress upon the word elevating, elevating the butts of the grain, which seems to be the burden of his song all the way through, but he recognizes the fact, when he says in the same sentence, in line three from the bottom, page 325, "and delivering grain of different lengths at the same point substantially as specified, *i. e.*, moving the grain endwise."

Mr. Renwick quotes from the second claim as follows: "Having its pulley or wheel arranged with their faces parallel with
121 the upper surface of the main elevator," and argues, in connection therewith that Olin is limited to the position of an incline, that is, the ascending side. I construe this to mean that, Olin having shown his devices, as well arranged, to perform the offices required of them, he states their relative position as shown, namely, with the faces of the wheels parallel with the surface over which the grain passes. I am aware that he might have framed

his claims to fit any of the imaginary forms or arrangements which a fertile brain may picture, and the claims so drawn be vague as compared with the drawings of his patent. The drawings, descriptions and claims are clear, and correspond well with each other, and his device is clearly not different in its construction and operation from defendants, as I have shown.

Should the court hold that there is a difference between Olin's and defendants' devices, I trust that such difference can only, by any possibility, be one of degree and not of kind, and will state again, that I am not clear that I have ever noticed even a difference in degree in the operation of the invention when applied in Olin's position as on the Buckeye machine, or in defendants' position. As a matter of fact I became familiar with the Olin invention long prior to the filing of this application for a patent and conversed with him frequently, regarding the application of his invention to different forms of machines. There seemed to be one prominent idea in his mind, namely, that his belt Q should be located so as to act upon the flowing grain at any point between the receiving platform and the binder receptacle.

In the position which Olin's belt Q occupies in the drawings, it does not act, only as a conveyor but an elevator of the butts. It is something supplementary to the main conveyor or elevator and hence I deem it perfectly proper for Olin to speak of it, as an elevator, and a butt-hastener, and to speak of it as combined with the main elevator, hence although he has seen fit to call the parts by the simplest names, I do not think that he has limited himself in claim three. Renwick complains, among other things, that the claim is not clear, that there is nothing to show what "advanced in front of the line of grain travel," means. This specification, however is addressed to those versed in the art, to those who are supposed
122 to know or to have known what the line of grain travel means or meant ever since Mann or Haines first gave the swath of grain a line of travel.

Mr. Renwick does not attempt to meet the fourth claim. He evades a proper consideration of the fifth claim by stating that he does not understand the devices forming the elements thereof. In reply, I can but say, that I do not see how they could be clearer without unnecessary prolixity. At top of page 354 Mr. Renwick considers the sixth claim at some length, but evades a proper consideration of it by switching off, so to speak, to state his inability to see how a chain could be used in place of the belt. A chain is not mentioned in the sixth claim. As a matter of fact chains have been used for the purpose and have been found to operate well. In such a case the teeth of the belt are so close together that there are no interstices of the chain exposed to the butts of the straw. All through his consideration of the Olin patent he seems to emphasi-e the matter by speaking of the "ordinary elevator" or "main elevator." I do not know what he means by so doing, but have shown that Olin specifically states that he does not confine himself to any particular elevator.

The patent to Geo. F. Green, No. 188,125, is introdued as antici-

pating Olin. Regarding it, I deem it but necessary to say, to begin with, that it is a false model, gravely so, it seems to me, because of the effect which it might have on the mind of the court, in that it might lead him to think that in the use of the rod and handle for moving their adjusting device, they had but taken bodily that used by Green. A reference to the Green patent will show that he has a board pivoted at the foot of the elevator and adapted to be swung at its upper end by means of a small peg-like handle, with no means whatever for holding it in any position of adjustment, while the model shows exactly defendants' form of Olin's adjustment device. Regarding the operation of Green's invention, I can but say that it is not necessary for me to regard what the inventor intended to do with it, as a matter of fact, it can by no possibility so operate as to perform the offices of Olin's invention. On the contrary, it is a retarding device. It tends to prevent the adjustment of the grain, and I do not see how a device, though it may be an attempt to perform a certain act, if it performs directly the
124 opposite things, can be considered as an anticipation of mechanism which faultlessly accomplished the thing aimed at. Sketch two, already introduced, well illustrates the effect produced on the butts of the grain in retarding them, so well, it seems to me, that words are not necessary.

(Here follows diagram marked p. 123.)

Mr. Renwick attempts, at top of page 365, to show that Green's device will operate like Olin's, and quotes from Olin's patent, with the Green device before him—reply is hardly necessary, but I will say, however, that Green's device retards, Olin's advances. Green's device moves the straws of the swath further from the proper parallelism, Olin's produces parallelism. Green's produces a stoppage of the flow of the grain. Olin provides that no stoppage shall take place.

The Green device is so far from being an anticipation of any of Olin's claims, that there is not even one element which is found in said claims.

In view of the facts brought out in Mr. Renwick's cross-examination, his opinions of the Green device must necessarily receive but little consideration; yet there is one statement that I will not omit to consider, "and if the court shall hold that these teeth are not included in the claim, then this board ('Green's board T') is the equivalent of the butt elevator Q of the Olin patent." I find no limitation in any of Olin's claims limiting him to ribs or teeth on the belt Q. It is, of course, necessary, and but necessary, that the belt Q shall act aggressively on the butts of the straws. If made merely of coarse canvass it would be effective to a very great degree, and would advance the butts. I can hardly think of any flexible substance, which, moving in actual contact with the butts of the grain, would not tend to advance them. How can a mere stationary board, whether rough or smooth, act in any other way than to retard, if swung to a position not exactly in line with

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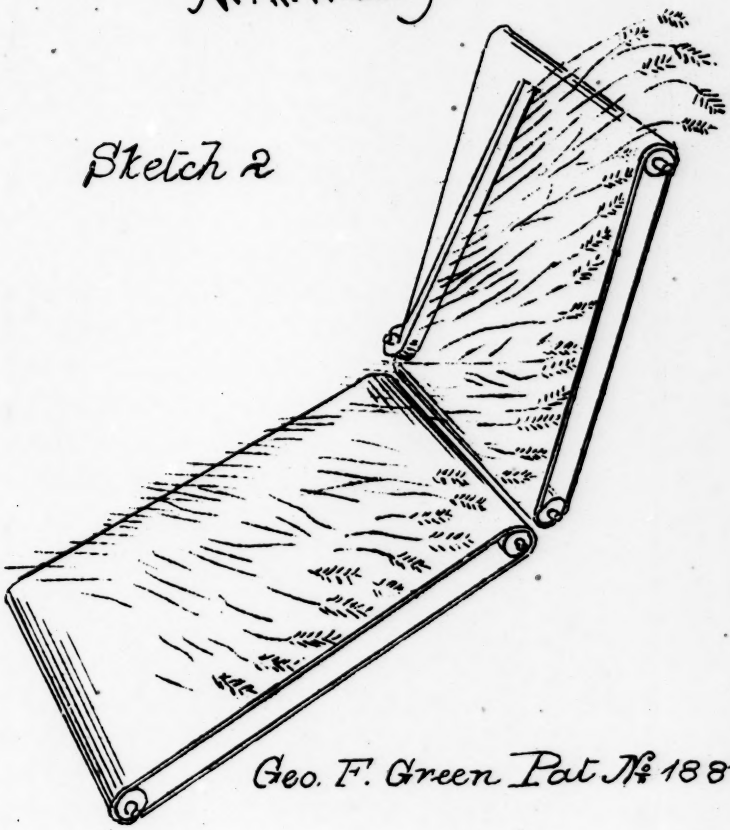
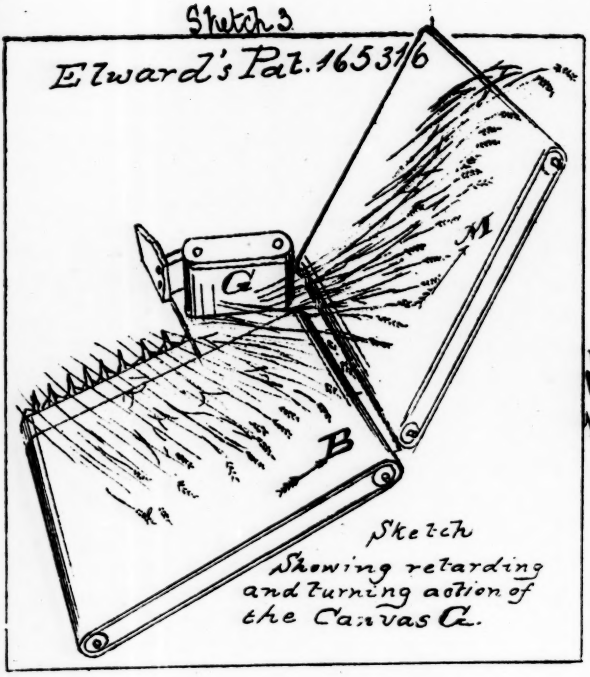
Dreering
v.
W. H. W. et al.
p. 123

Sketch 2



Geo. F. Green Pat No. 188125.

Sketch 3




No. 944.
Drering
v.
W. H. Wetal
p. 125a

the normal course of grain travel. It seems clear to me that instead of being a limitation on the Olin patent, the Green device should but compel a higher estimate of Olin's success, and of the value of his invention. Renwick says, Green's board "acts upon the grain to shove it endwise." This is simply impossible; the board retarding the butts would but wheel the straws, "right into line" following each other endwise in case of short grain, and badly enough so, in long grain, as shown in the sketch.

125 Patent to Elward, number 165,316 is introduced. It seems to me that Mr. Renwick makes all of the capital out of this device that can be made, and attempts to make a great deal more, as I will endeavor to show. The belt, which he has lettered G he considers to be the equivalent of Olin's belt Q. Now, in order to be such, it must perform substantially the same offices in substantially the same manner.

(Here follows diagram marked p. 125*a*.)

It should advance the butts; in fact it can but retard them. To be operative, as a device for advancing the butts, it must be moved with a positive force. As a matter of fact, the adjusting belt on defendants' machine, is absolutely inoperative unless it is kept so tight upon its driving drums that they shall always move it. Unless exceedingly tight the canvas is not moved with force enough to carry the butts of the straw, and the said canvas becomes an obstruction. In that event the grain is wheeled by said resistance and pitches head first into the receptacle. This is a matter of practical knowledge, as I must have encountered it many hundred times. Judging from analogy, Elward's device could but do the same thing. I have introduced a sketch number three which shows the effect that this would necessarily have upon the grain. I am aware that Elward says that this canvas may be rotated, but he does not say how. If it were positively rotated it would still be incompetent to perform the offices of Olin's belt Q because it is not adjustable at its delivery end, and hence, could not give directions to the swath. I do not think Mr. Renwick was warranted in having the bevelled gears applied to the Elward model, in the manner he has, if at all, because I do not think it practical so to do, for the following reasons: without exception all manufacturers of harvesting machines who use an endless canvas butting device have the same relative speeds and proportions of gears are used as found in defendants' machine. As nearly as I can tell, the gear which drives defendants' adjuster (the Winona) before me, which does not differ, that I am aware of, from the McCormick, is over three inches and five-eight-s in diameter. If the shaft which moves the platform conveyor were extended forward so as to drive the adjusting belt in the position shown in the Elward model by means of bevelled gears, it would come within two inches of the ground, or less, if the machine were tilted down, and this would leave but $\frac{3}{16}$ of an

126 inch of clearance. The gears would thus be inevitably plowing into the inequalities of the ground and the device could not be operative.

A two-inch stubble is not an uncommon one, and if the roller were driven by a gear, some idea of the nearness of the gear to the ground could be gathered by referring to Elward's Fig. 1. I find, as I have stated, "that it may be given a positive movement by gears or belts and pulleys from any convenient driving shaft," the movement of the apron in either case but serving to move backward the butts of the grain projecting over the finger bar. Perhaps Elward means that it would push them backward, relative to the line of advance of the machine—if he means move them backward relative to their line of advance, he is certainly correct. I do not think that such an understanding can be considered an unwarranted one, because it would so move the butts that they would enter the elevator, part of which is omitted in the model.

I am warranted, I think, in denying that Elward ever contemplated advancing the butts. The words "this apron may be operated either by the friction of the passing butts of grain," are evidence that he did not comprehend the work to be done. The movement of the butts of the grain against it could never be sufficient to move it, on the contrary, contact with it would prevent it from moving. As I have stated, the common adjusting belt is prevented from movement, if not particularly tight, by contact with the butts of the grain.

If he means that gears might be used that would give it as positive a movement as the butts of the grain would, then his device would be inefficient. The actual requirement of positive driving of the adjuster belt is evidenced by the fact that, large as the bevel gears are which drive it, they are worn by use, in ordinary machines, as much as any other part thereof.

Now, comparing the operation of Elward's device with Olin's device, I do not consider it a limitation because Elward's canvas belt G is far from being Olin's canvas Q. In fact, so far that it does not perform any one of the functions of Olin's device. On the contrary,
127 it tends to produce results diametrically opposite from those attained by Olin. For instance, Elward's belt retards the butts. Olin's device advances them. Elward's renders the straw more oblique; Olin's produces parallelism. Elward's device but wheels the straws so that their butts may enter the elevator: Olin's device shoves them headward. Olin's device is adjustable for a purpose; Elward's device is not adjustable at all.

I will not deny, but Elward thought that his belt G might be moved positively. He says with "pulleys or gears." With Olin's device before us, his belt Q driven by the same shafts that operate his conveyor, it is easy enough for us now to say, why, that is undoubtedly the way that Elward intended. But let us see further, he says: may be driven by "pulleys." He did not mean pulleys in the position of the conical gear shown in the model, because pulleys would not work there. Where his pulleys were to be located is far from clear. He has no pulley on his machine so located as to drive the belt G without additional gearing, none of which is shown. In view of the impracticability of driving his belt G, as shown in the model, if he had any idea at all, as to where the gearing should

be located, I incline to the belief that it must have been from some arrangement above. For instance, located at the front end of the seat-board. If it is considered that my supposition is far-fetched, it will answer my purpose, I think, in showing that Renwick's supposition is far-fetched also. Clearly they are both so far-fetched, it seems to me, as to remove Elward from any consideration whatever.

In view of my comparison of the operation of the two devices, I trust that I need not say anything regarding the statements made by Renwick at the foot of page 357 of the printed record, unless it be that in one, the butts move the belt, and in the other the belt moves the butts. I have never seen (but had it existed I should probably have seen) a device like Elward's, and with my knowledge of the art backing me, I insist that it would be totally inoperative.

Mr. Renwick says, in the middle of page 358, "now the claims of the Olin patent seem to have been made in view of this Elward patent number 165,316." This seems to be unreasonable, because, as I have shown that there is nothing whatever in this Elward patent to in any way affect Olin's application, Elward showing not even one element of Olin's combination. Olin's application was referred to Elward's 161,396, not 165,316 as I have learned
128 from the office records, but such patent has nothing whatever to do with the elevating or conveying devices, simply has reference to the wire rods and board R. As far as the essential features of Olin's device are concerned he is unscathed. When Renwick says that the Olin patent, "seems to have been made in view of Elward" and thus limited, the inference might be drawn that the Elward patent cited in the application, was this one. And I have taken this trouble to guard against any such inferences. Elward number 177,231 is introduced by Mr. Renwick and a model thereof, and he goes on at length to show how this patent limits Olin. With these two patents before me it seems to me a clearly significant fact, that they were not considered by the office as affecting Olin's invention at all, because neither of them is mentioned in the official letters to applicant. Had Olin limited his claims to avoid, they would have been pertinent in this case. That he was not referred to them is evidence, to me, that he is not limited by them, but on the contrary that his patent was allowed in the face of them. At the bottom of page 358 Renwick says that the only novelty, amounting to anything in the Olin patent, is transferring the Elward butter from a horizontal apron to an elevating one. If Elward's device operated in one essential like Olin's, to that extent that would be true. But I have amply shown that it does not. On page 359 Mr. Renwick attempts to show non-infringement by saying, that in defendants' machine the grain is not being elevated while acted upon by the butting belt, but on the contrary that the action of the belt of the butter is after the grain has left the main elevator. He ignores the fact that the work of conveying is not finished when the grain leaves the upper elevator roller, ignoring the fact that defendants' packers are conveyors.

What, if, for a moment, Mr. Renwick's statement is true, it is

nevertheless a fact that in each device, we have absolutely the same elements operating together to produce the same result. If he means to state that the main elevator and the supplemental elevator operate consecutively instead of simultaneously, he does not show that the effect is not absolutely the same in the end.

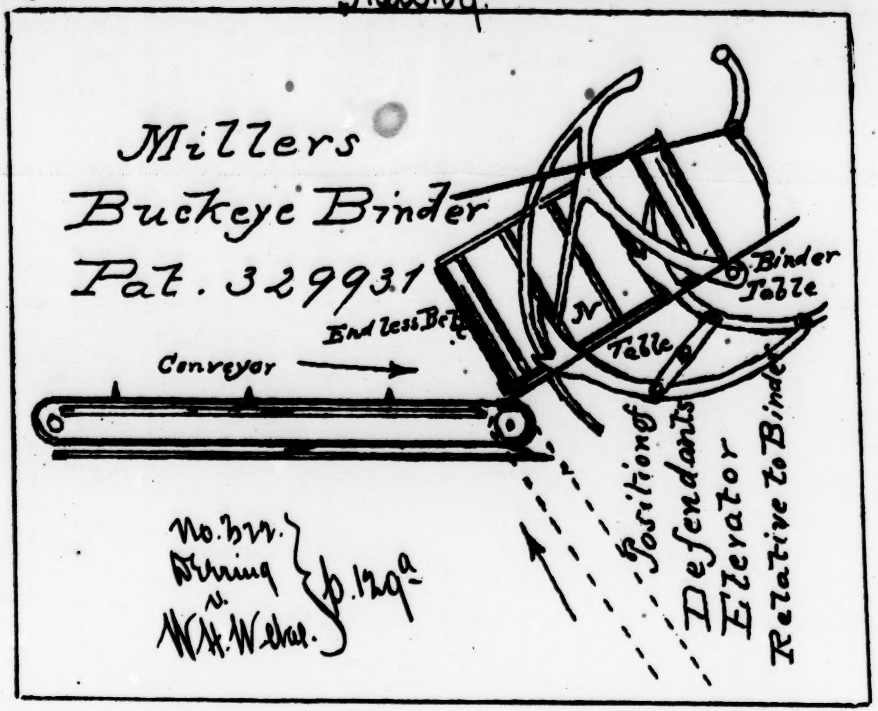
In some conditions of grain, namely, that which is very tall and lean far from the machine, and which by the entanglement of the heads of the incoming grain, with that being conveyed on
129 the platform, the swath is moved so far backward that the brushing effect, which I have mentioned, does not turn the straws head first; the butts are then permitted to come up first. In this condition, sometimes the butts are so far in advance that they are seized by defendants' belt Q and carried onward, swung forward to the fullest extent before the heads have left the contact with the main elevator. If he means that there is no combination in the arrangement of parts because they do not operate simultaneously, he is evidently wrong, because in the condition which I have cited they do operate simultaneously. I do not wish to be considered as admitting the correctness of his position, because I have stopped to argue it. He says regarding the McCormick model, "on the upper corner of this deck is mounted what may be called a butt slider and depressor." If he had said butt slider and advancer, it would have been equally correct. What is Olin's but a butt slider and advancer? As I have shown, the Miller arrangement of the butt-adjuster is identically that of Olin. Turning now to sketch nine, if I hold it in such position as to read the words, "Buckeye binder" correctly, it is Olin's arrangement. If I turn the sketch upon its end so as to read "Defendants' elevator" correctly, then it is defendants' arrangement. I admit that defendants have changed the angle of the butter relative to the incline portion of Olin's elevator; but to move it however to the declining portion, and I repeat, that I find it impossible to tell, any difference in the operation of the devices because of such shift of position.

(Here follows diagram marked p. 129*a*.)

I have treated Olin's main elevator as a conveyor, and his belt Q as a supplemental conveyor, because he shows it a supplemental elevator. Defendants' butter belt is as much a supplemental conveyor as Olin's. I have often heard the parts of machines like the defendants' spoken of as "main elevator" and "little elevator."

Renwick says defendants do not infringe, because the faces of the butt-depressor are set at right angles to the deck, not to the main elevator. It is but required in the Olin patent that they be set at right angles to the face over which the grain moves. Defendants' so-called deck, is just as much, the thing over which the grain moves as is Olin's board M'. He attempted to make a point by saying that Olin's device is to lift the butt up and defend-
130 ants' is to knock them down. If defendants should tip the outer end of their binder up so high as to give the deck an

Sketch 9.


Millers
Buckeye Binder
Pat. 329931
Endless Belt
Conveyor
Binder Table
N
Table
Position of Defendants Elevator Relative to Binder
No. 322.
Derring
v.
W. H. Weber.
p. 129a

incline they would of course put their adjuster in a corresponding position, then his difference between Olin's device and defendants' would vanish. Their device would operate exactly as does Miller's. The operation of their machines not thus being effected. Mr. Renwick confusses what he calls the deck, with a binder receptacle. In order to make this matter clear, I have already at some length defined, what, in the art, a binding receptacle is.

Reference to defendants' machine (Winona), which is before me, will show that there are 24 inches, by actual measurement, from the beginning of the so-called deck, to the lowermost stroke of the packer. This is space over which the grain travels before it reaches the receptacle, and in order that it may travel thereover, the packers have a sweep sufficient therefor, and that, simultaneously with the action of the butt-conveyor. He says the grain is moved "endwise by the butt-depressor, only after it is deposited upon the receiving table, and whilst sliding down the same." Why does he not add, on its way to the binder receptacle? It would be true, and equally true with Olin's, ignoring the relative terms up, and down, as I think is proper. In order to make it appear that Elward's patent 177,231 (not cited as a reference in the Olin application) should cut some figure, he says that defendants' device moves the grain endwise while it is sliding down, and that it thus "performs the duty of the adjustable board $F^1$ on the right-hand side of the deck of the machine." Sketch number four shows the action of this board $F^1$. With such a device, grain that is brought over endwise is pitched onto the binding table and the board $F^1$ but serves as something for the butts to lean against. This I have tried and know the effect to be as I have stated. At the foot of page 360, Mr. Renwick attempts to show that defendants' device is but a combination of Elward's 165,316 patent with the Elward 177,231 patent.

Suppose for the moment, that in such a combination we should find a deflecting surface given an aggressive movement, and adjustable to change the line of travel. We do not find any such combination before Olin. We would but at best find two seperate elements, uncombined. A feature equally essential in Olin's
131 and defendants' device is that the butts of the grain shall be advanced, and thus parallelism produced. Although Elward says his canvas may be driven, he does not hint that by any rate of speed parallelism may be produced, and I have shown that both of his devices tend to retard—tend to swing the grain more. I trust that I have fully shown that it makes no difference whether the butter acts upon an incline or a decline, and that defendants' binder, if put in the position of Miller's binder, would be the same thing. They had chosen to locate the binder on the stubble side, and hence have conformed the elevator and butter thereto. Having shown that the relative terms up and down, bottom and top, upper and lower, mean—can only mean—receiving and delivery ends; it is not worth while for me to discuss the statements made by Renwick, on page 261, to any length. Thereon he gives five reasons why defendants do not infringe. His first

reason is: "They have no butter which elevates the butts of the grain." My answer is, nevertheless, it advances.

He says, second, the defendants' butt-depressor is not pivoted at its lower end, but at its upper end.

My answer is, it is pivoted at its receiving end, so is Olin's. He says, third: "The butter of defendants is not combined with the main or harvester elevator which is elevating grain, but, on the contrary, with an inclined deck, or chute, on whose surface the grain sliding downward." My answer is, they do have a butter, combined with a main elevator and conveyor, which is conveying the grain into the binder receptacle. He says, fourth, "In Olin's the upper end of the butter is adjusted and necessarily so. While in defendants' the lower end is adjusted and necessarily so." My answer to this is that both are hung at the receiving end and both would be absolutely inoperative if pivoted at their delivery ends. Of what use is it to turn the farthermost end of a switch from a train that is moving. I mean the end farthest from the moving train. He says, fifth, "In Olin the faces of the pulleys which carry his butter are parallel with the face of the ordinary or main elevator, while in defendants' the faces of the pulleys which actuate the depressor are at right angles to the main or ordinary elevator. My answer is, in so far as it is necessary for Olin's device to operate, it must be located with the faces of the pulleys so that the belt
132 shall move along, in proper relation to the surface which supports the grain. This is equally true in defendants'. To sum up, Renwick's five reasons why defendants do not infringe, are distinctions and not differences.

At the bottom of page 361 Renwick attempts to show non-infringement of Olin's third claim, but ends only with the statement that the operations are entirely different. I trust that I have made it sufficiently clear that there are no practical differences.

I will treat of Renwick's consideration of the fifth and sixth claims, when treating of infringement of the Olin patent, in detail. Mr. Renwick states in reply to Q. 19, that no machines have been put on the market with a butt elevator upon the grain side of a main elevator. Of the Buckeye type there have been many thousand built, as I am informed. They have, to my knowledge, been built for several years. Mr. Renwick states in answer to Q. 20 that the packers are not an elevating apparatus. My answer to this is, that they are conveyors and in Miller's positions they are an elevating apparatus. He further says, on the contrary they are a depressing apparatus, for forcing the grain downward on the deck. My reply is, change the angle of the deck to an incline, and then what are they? He says that the packers do not begin to act upon the grain, to aid its descent until the grain has been nearly, or entirely shoved over by the depressor crowding it endwise. This shows me that he is totally ignorant of the practical operation of the devices. In sketch B, of number nine, a frequent condition of the grain is shown, and in photograph "Plaintiff's Exhibi-Showing Position of Straw Relative to Adjuster Belt" the grain is shown as being acted upon by the said belt. This photograph reminds me

No. 322
Deering
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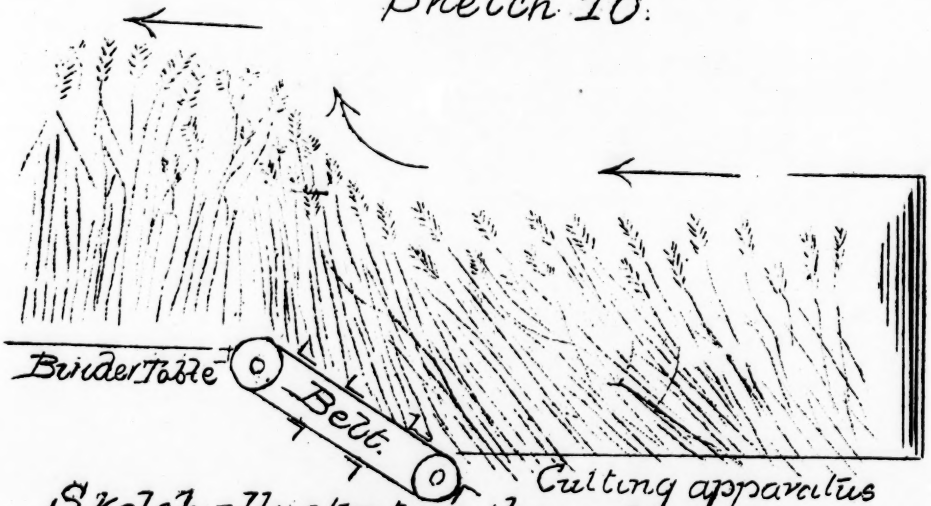
W. H. W. Hal.
p. 133a

Sketch 10.




Sketch illustrating the action of adjusting-belt upon a swath of flowing grain

that I have not yet considered the grain acted upon in one light, namely, that in most conditions it may be considered as a continuous swath from the grain end of the platform to the binder receptacle;—that is, I have not treated it as possessing individuality. This last photograph and the one "Complainant's Exhibit Photograph Showing Angular Position of Straws While on Platform" (with the exception of that actually in contact with the elevator) will show what I mean. The parts of this swath, as a complete thing, and the action of the belt Q upon it *is* shown in sketch 10.

(Here follows diagram marked p. 133*a*.)

133 Mr. Renwick says the "term elevator had a definite significance as applied to grain-binders long prior to the date of the Olin patent." My reply is, that this is correct, and it is equally true that defendants' form of elevator was in common use, and also true that Olin says his belt Q may be applied to other forms of elevators. It is also true that in the multitude of patents prior to Olin, elevating devices pitched at various angles, were known. It is equally true that these elevators were without one exception, conveyors. There is one point that I would consider trivial,—only, that by ignoring it, Mr. Renwick seeks to show non-infringement,—and that is, that Olin's elevator, if he is confined to it, is something more than a common elevator, in that it delivers the grain, not only to its highest point, but carries it down a decline fully into the binder receptacle. All of this the defendants do, using the packers however, for the purpose, instead of deflecting the elevator downward. I will now take the Olin patent and consider its claims more minutely, especially the latter ones, and show wherein their elements are found in defendants' machine.

Adjourned until tomorrow morning, January 4, 1888, at 10 o'clock.

JANUARY 4, 1888—10 o'clock a. m.

Met pursuant to adjournment.
Present as before.

Witness resumes:

The fourth claim of the Olin patent covers a pivoted frame supporting the elevator Q in combination with mechanism for producing adjustment under control of the driver. The claim reads, "The pivoted frame or bar supporting the elevator Q, in combination with the sliding bar *l*, rod *m*, and lever *o*, for adjusting the upper end of the belt, substantially as and for the purpose described." Referring to Fig. 6 it will be seen that *l*, is a part connected with the frame *e*, pivoted to this is a bar *n*, and connected to a lever within reach of the driver.

Turning now to the Winona machine there is clearly to be found the frame upon which the belt is mounted, that is, Olin's part *e*. The irregular-shaped malleable piece to which the butt-board extension is also secured is Olin's part *l*. Olin's sliding rod *n*, is the

long sliding rod in the Winona machine, and *o*, is exactly like the Winona lever. An equivalent construction would be to con-
134 sider Olin's part *l*, and *n*, as one, and the parts *t*, and *s*, as the Winona guides. There are slight differences in the details of construction, but no differences in operation.

Turning now to the McCormick model I find a sliding rod connected with the adjuster frame, but no lever unless the rod itself be called a lever, which would be hardly proper. There is found however an equivalent for the lever, in that the rod is so shaped as to form a handle by which it may be moved. This performs all the offices of Olin's devices, and is clearly the equivalent thereof.

Regarding the fifth claim, which reads:—"The shaft W, wheel *h*, and frame *i*, in combination with the gear wheel *g*, and pulley wheel *d*, for driving the elevator and keeping the gear wheels *g h*, in gear, substantially as specified." The construction of both the defendants' devices is identically the same in both machines, the Winona and McCormick, and in them I find all of the elements of *of* this claim. These devices are provided for retaining in proper relative positions the driving and driven shafts and for conveying motion from one to the other, to a device capable of being moved upon the driven shaft as an axis. In both defendants' machines the shaft W drives the elevator drum, and it has on it a wheel like Olin's. The butt adjusting canvas has the gear wheel *g* driven by the small wheel *h* and the drum which drives the butt-adjusting canvas is the pulley *d*. By the use of this frame the gear wheels *g* and *h* are kept in gear, whatever the adjustment of the belt Q. There is no material difference in form and absolutely no difference in function between this claim and the combination of parts in defendants' machines.

The sixth claim reads:—"The elevator or belt Q in combination with the board R, and main elevator substantially as described." This claim, but little differs from others, but that the incline board R is added. The board is a necessity, its office being to hold the straws in proper position relative to the butting belt, so that they maybe acted upon. In defendants' machines that part of the conveyor from the highest point the grain is carried to the lowest point, is not only the equivalent of, but is in fact in every mechanical sense Olin's main elevator. The butt-adjuster is clearly Olin's so-called "elevator or belt Q"—his supplemental elevator or belt. The wide sheet-iron pieces in the Winona machine is
135 his board R. The like piece and the small piece attached to the adjuster frame in the McCormick machine constitute Olin's board R. Maintaining, as I do, that Olin is not limited because of the use of any mere terms of expression, such as the relative words top, bottom, &c., I construe this claim to cover a conveyor adapted to move the butts of the grain, in combination with a supporting surface and with a plane or other surface to retain the grain in proper position to be controlled.

A number of patents have been introduced in evidence, but not dwelt upon by Mr. Renwick. I will next consider them. The two patents to Edwin Chapman, 192,150 and 192,151, are in all essen-

tial respects like the Elward patent, 177,231, which I have considered at some length, and I will not refer to them further than to say, that Chapman shows whereby they may be moved by the driver. They possess all of the defects of Elward's device, but not one of the benefits of Olin's device. The patent to W. L. Williams, No. 89906, does not show an endless belt for any purpose. The patent to McPherson has a device to produce central binding, but it is not by means of anything advancing the butts of the grain, and adapted to push them endwise at the same time. In the early patents to Marsh, which are set up in the answer, a portion of the elevator is shown, which is adapted to move more rapidly than the other portion, but it is not adapted to move the grain endwise, or to even up the butts, and is in no way adjustable. Central binding is in no way affected by it, hence it cannot be considered, as I view it, to anticipate Olin.

Q. 13. In this connection, please state whether you have examined and understand the Bullock & Appleby patent of October 31, 1882, No. 266,949. If so, please explain the bearing, if any, which that patent has on the case.

A. This patent covers a device of the kind of which Olin's forms a prototype, and is precisely for the same purpose. I find in the patent a sort of an explanation of the different methods that have been used for the same purpose, and objections to them. They say: "One of the usual provisions for the accomplishment of this object has been the employment of some sort of means by which those appliances of the harvester which serve to contribute to the purpose of binding may be adjusted relatively to those parts of the
136 machine which perform the operations of cutting the grain and conveying it to the locality at which it is to be gathered into gavels and bound into sheaves." They go on to state: "Another provision for the accomplishment of this object has been in the use of a deflector composed of a board arranged edgewise on the receiving table, pivoted at its upper end, and to be set and held at different angles, according to the length of grain, and designed to cause the descending stream of grain to be shifted sidewise." This is a very clear description of Elward's, Chapman's, and indirectly, Green's devices, and they truly go on to say: "And in practical operation a plain-faced board or face is not an efficient means for effecting the designed adjustment of the grain stalks endwise. The butt-ends of the stream of grain will lag by contact with the stationary surface of such a designed deflector or adjuster, and the grain will not be properly guided to the binder or to the point at which the binding is to be done." The specification goes on to describe the device, and its operation, and I find that they speak of one thing which they claim to be an improvement, as I view it, over the operation of Olin's device. This is what I referred to when I spoke of the possible validity of the Bullock & Appleby patent in view of the state of the art. They state that the operation of their device is such as to act on the stream of grain while it is in a descending, and sort of floating condition. This their device is enabled to do, possibly, and if so to do, because the grain is not con-

fined or held in position by Olin's board R, or any equivalent thereof. Furthermore they show no mechanism whatever for conveying the grain from the uppermost height to which it is carried, positively into the binder receptacle, as Olin does and as defendants do. With these parts wanting, as in the Bullock and Appleby, I can conceive that an adjusting belt might be operative to a greater degree than Olin's or defendants', but the operation would be the same in kind however. In Olin's device and defendants' the grain on its way to the receptacle is controlled, nearly, or quite all of the time while being acted upon by the conveying devices. It is not in the floating condition, it would be, if unobstructed by any of the devices which move it, but permitted to fall all of the way into the receptacle, as they evidently intend. What they term a floating condition may differ somewhat from what Olin speaks of as
137 being the flowing condition of the swath of grain operated upon, when he speaks of his devices as being so adapted as not to check the flow of his grain. With the fact in mind that the Bullock & Appleby adjuster might possibly act upon the straws to a limited extent while floating in the air, the first claim may be, possibly, valid. The operation of this, with the possible exception I have mentioned, is exactly that of Olin's, as I have stated. If anything, it is but an improvement upon the latter. Unless combined with conveying mechanism as Olin's is, it would not in my opinion, be operative upon any modern binders. In view of the fact that attempts may be made to show that this patent has an important bearing upon the case, and as the latitude of the question is such as to permit me to do so, I will further say, that in my opinion, it cannot be shown, that the device is an independent invention, and thus not following as a possible improvement upon Olin's for reasons which I have stated at some length, which I will repeat in short. Olin's device, and Miller's device are absolutely the same. Miller's device as far as the butting canvas and conveying mechanism (packers) and binder receptacle are concerned is the same as defendants'. The McGregor & Flenniken devices are same as both Miller's and defendants'. The mechanical construction and operation of all being alike, they may be considered as being alike, there being no other competent test.

Referring now to the certified copy of the file-wrapper and contents of the Olin patent introduced by defendants I find that McGregor & Flenniken and Albert Goodyear were in interference with Olin. The McGregor & Flenniken device is exactly defendants', and I find the issue to have been, first an endless belt moving in the direction of the grain delivery, operating in contact with the end of the grain to deliver it to the binding mechanism. Second, "an endless belt, mounted in a swinging frame, and moving therein in the direction of the grain delivery operating in contact with the ends of the grain and made adjustable to vary its inclination relatively with the direction of the grain delivery to present the grain having long or short straws centrally to the binding mechanism." These issues, it seems to me, are properly drawn. The question but remains whether Olin's claims cover them. I trust I have shown

that the alleged limitation- found in the Olin patent are not
138 such, and hence that the first three claims of the Olin patent embrace the issues. The issue in the Goodyear interference I find to have been the combination, in a "grain binder, of an elevated platform for receiving the grain, apparatus for placing and securing the band around the bundles and an adjustable rotating guide for determining the point at which the band is passed around the stalks." This would clearly fall within Olin's first claim, also his third and perhaps others.

Counsel for complainant offers in evidence a certified photo-lithographic copy of the original drawing filed with the McGregor & Flenniken application which afterwards was issued as patent number 223,187, including the figures of such original drawing, which was in interference with the Olin application, and which were afterwards cancelled.

Also a copy of the Goodyear patent number 229,396 referred to in testimony of Mr. Steward as having been in interference with Olin.

Counsel for McCormick objects to so much of witness' last answer as relates to alleged conversations with Wm. F. Olin, both as hearsay and irrelevant and incompetent, was all that relates to interferences declared by the Commissioner of Patents between Olin's patent, subsequently to the date of its grant and to the McGregor and Flenniken and the Goodyear exhibits, just offered, as incompetent, irrelevant, immaterial and entirely outside the limits of rebuttal evidence.

Cross-examination by Mr. PARKINSON:

X Q. 13. Are you paid a salary by Wm. Deering?

A. Yes, by Wm. Deering & Co.

X Q. 14. Has Wm. Deering & Co. any interest in the outcome of this suit, pecuniary or otherwise?

A. Not that I am aware of.

X Q. 15. Does your salary from Wm. Deering & Co. continue while you testify in this case?

A. Certainly. I will explain: the patents are held by Wm. Deering; there is no understanding between him and the company, but as he is the largest stockholder those matters are left wholly in
138½ his hands. The effect this matter may have on the company will be but to permit them to be less molested, to say the least, in the rights which Mr. Deering grants them.

X Q. 16. Is Wm. Deering personally to pay you for your time spent in testifying here?

A. No. I think, perhaps I am mistaken in this matter, my contract was drawn before the formation of the company, so that although I am receiving salary from the company, technically I am in the employ of Mr. Deering.

X Q. 17. Are you a stockholder in Wm. Deering & Co.?

A. Practicaliy so.

X Q. 18. Wm. Deering is holding stock in the company in trust for you, is he not?

A. Yes.

X Q. 19. And under your understanding or contract with him the amount of that stock increases from time to time?

A. Practically so, yet there is a limit placed. The full amount of stock will be delivered to me when it has fully earned its face —. Such stock as is already paid for will of course be delivered to me at any time that I sever my connection with the concern.

X Q. 20. Is there any stockholder in the company holding stock in fee, except Wm. Deering?

A. That I cannot say. I think, however, his sons and a nephew, Mr. Porter, so hold it, but I am not sure. It is a matter that I give no attention, I play my part as a stockholder, having the right to vote the amount, regardless of the amount earned.

X Q. 21. Who has the con-rolling vote in the company?

A. Wm. Deering, I believe.

X Q. 22. Who prepared the various sketches and cuts that you have offered in evidence?

A. John B. Kaspari executed them, Mr. Whitney prepared most of the off-hand sketches that guided said Kaspari, my draftsman; I prepared a few. Those which I have personally referred to subsequent to that numbered nine, if I recollect rightly, I prepared. Those which Mr. Whitney produced were mainly from his suggestion and from very incomplete sketches to show the positions he wanted the parts in order to convey the ideas which he purposed advancing. I think that without exception all of the sketches were passed upon by me after they were put in shape by the draftsman; understand me, however, they were largely Mr. Whitney's suggestions.

X Q. 23. Who pays the salary of Mr. Kaspari?

139 A. Wm. Deering & Co. He was hired, however, by Wm. Deering, and there has never been any change made. Wm. Deering & Co., of course, assumed the pay-roll of Wm. Deering.

X Q. 24. Was he paid by Wm. Deering & Co., for his work upon these sketches?

A. Undoubtedly.

X Q. 25. Whose machines, teams and attendants were used in the experiments leading to these sketches, and who defrayed the expense?

A. Wm. Deering & Company. If you wish to call out just how Wm. Deering & Co. may or may not be interested in this matter I will cheerfully explain it.

X Q. 26. Where were the experiments conducted, and who were present at such as you attended?

A. They were made at various places. Those showing the action upon straw was made on the farm of Peterson, about four miles north of the city limits. There were many present in the field. Mr. J. H. Pitkin, aided me in taking the photographs, and the name of the driver I cannot give. There were several machines, and I do not remember that any others of those present in the field were at our machine at the time.

X Q. 27. On page 46 of the typewriter record you charge Mr. Renwick, the expert for the defendants, with grave errors and discrepancies in his questions from Olin's patent and say that "in the question is the following interpolation—he puts these words into Olin's mouth, regarding the location of his belt or chain, that is, the side furthest from the deck and not over it." Did you consult the original manuscript record before making this serious charge against Mr. Renwick?

A. No. I do not think I ever saw the manuscript record. I am not aware that such was ever furnished. I certainly do not recollect that it ever came into my hand. I was asked to consider his testimony, and the printed record furnished by defendants' to complaints' counsel was in my hand. Knowing that the printed record is the only one that the court reads aside from possible references to the written one, I set myself about correcting the errors therein contained.

X Q. 28. Were you not present a part of the time that Mr. Renwick was giving his testimony?

A. Yes, and noticed so many errors in interpretations of the various patents and statements as to the operation of devices,
140 that, I was thus warned to look out for them when called upon to testify as I then expected to be. I recognized his unfamiliarity with the art and expected them as well.

X Q. 29. Did my question call for what you noticed? If not, what was your reason for volunteering the statement?

A. No, but in your X Q. 27 you call it a serious charge; then I am guilty of a serious charge, and deem it proper to explain my position so fully that the court may know whether I am guilty of unfairness or not. If I have done Mr. Renwick an injustice, I shall be glad to know it. As you have the original record before you, I ask your permission to refer to it, in order that I may——

X Q. 30. I now show you the original manuscript record made by the special examiner as Mr. Renwick testified, and therefore made in your presence, and which you must therefore have known to exist; and ask you to turn to page 61, and read Mr. Renwick's testimony in which occurs the quotation which you say he has interpolated, the clause referred to, and state whether you do not find that clause in brackets; you may state also whether the request at the end of your last answer was not made after I had referred to the original record during the preparation of this question.

A. Answering the last part of your question first, yes. Your question 28, asked me if I was not present part of the time at the taking of Renwick's testimony. I answered yes; now your last question says that the record was made in my presence. You cannot put words in my mouth, unless it be unawares. The whole record was not made in my presence. Referring to the original record which you hand me, I find that certain parts have been enclosed in brackets, in ink sufficiently different to show insertion, subsequent to the taking of the proof copy of page 61. The word "of" contiguous thereto has, in my opinion, never been copied. Reading the written record as it now

stands, had I it before me at the time, I would not have charged Mr. Renwick with any error. But consider that it would be fairly within the question put to me to point out the error in the printed record. If the error is in the printed record instead of the written record then the responsibility for the error is shifted from Mr. Renwick to defendants' counsel, or some one in that interest. Surely I cannot be considered as guilty of any offense in pointing out the error, and ascribing it to the one, who
141 gave the testimony, recorded in said printed record. Upon further reflection, in view of the fact that almost the sole defense in this matter is that the location of Olin's device, upon the side farthest from the deck, and not over it, and that such matter of position may possibly be the turning point, I am constrained in the interests of equity to consider this error farther. The brackets are in the quotation in the written record. This may be a customary method used by writers to assume responsibility for words interpolated into a quotation, but it is not the right way, for the reason that it would be impossible for the court to know, without looking for the words in the Olin patent, whether the brackets and words contained between them were words of the quoter or quoted. I observe that the brackets are not struck as regularly, and with as fine lines, as Miss Wells, the writer of the page, has displayed. Further, turning to Mr. Renwick's signature, I find his letters closely condensed, but struck with regular curves. The word "of," referred to, is not condensed, it being evidently struck by one who writes in a round hand. The word is not that of Miss Wells, I think, for the reason that it differs so far from the word "of" in the third line above, and other places on the page. Upon the margin of the page, beside this matter, I find a hand roughly drawn, as if calling attention to something. I am not an expert in handwriting, but mention these things, as they seem to me, leaving the court to determine the responsibility for the errors.

X Q. 31. Now, having given your opinions upon railroading, penmanship and rhetoric, please turn to page 57 of the typewriter record, and state whether the words, ("Green's board T") enclosed in brackets, are a part of the quotation from Mr. Renwick's testimony in which they occur, as given in your answer at that point?

A. A careful examination of this will show that I have done exactly the right thing, that I have quoted 29 words from Mr. Renwick. In order to explain what word I consider him to be treating of, I cut the quotation in two, moving its members, so to speak, so far apart as to be able to insert, in parenthesis the words, (Green's board T). The quotation marks before and after Green's do not mark the beginning and ending of those words as a quotation, but mark the closing of a part, and the beginning of the remainder
142 of the quotation as a whole. I may have sometimes used the brackets improperly, however, or errors by the typ-writer may have crept in. I have not yet had an opportunity to go over the whole of my examination to correct it, but will insist upon so doing, if counsel wish me to be in a position to be wholly responsible for what I have done before further proceeding.

X Q. 32. In your answer to question 30, you state that page 61, of defendants' original record is in the handwriting of Miss Wells. How do you know that it is?

A. By comparing it with page 158. They seem to be the same. I am not posing as an expert in writing, however.

X Q. 33. Do you mean by comparing it with the signature of Alice S. Wells, notary public, at the foot of page 158?

A. I mean to say that I am not enough of an expert to distinguish positively between the handwritings on page 61 and page 158. The general appearance, however, holding them side by side, would perhaps indicate that they are not in the same hand, yet I find the capital H's struck alike, and others similarly. Comparing page 158 with the signature below, I am not certain that the signature is written by the same party. I now incline to the belief that it isn't. The signature of Miss Wells, and words following, are more nearly like the word "of," on page 61, than like the handwriting that fills the page. I am not so unwise as to say anything regarding this positively. I have called attention to the matter, and my duty is done.

X Q. 34. You say that you have testified as expert in several suits for infringements of patents. Please enumerate such suits as you have testified in.

A. Hodges *versus* Deering, George B. Wilson *et al. versus* Deering & Co., Gordon against Warder, Bushnell & Glessner. These are all that I call to mind at present.

X Q. 35. You testified in behalf of Deering & Co., in the Wilson case, did you not?

A. The case has not yet been decided, and it is for the court to determine in whose behalf I testified. I attempted then, as now, to give what I consider a fair and absolutely correct interpretation of the patents and statement of facts. Wm. Deering & Co. paid me.

X Q. 36. You were put on the stand in behalf of the defendant, however, in that case, were you not?

A. Yes.

143 X Q. 37. Referring to the Gordon case against Wardner, Bushnell & Glessner, Wm. Deering or Wm. Deering & Co. had been sued by Gordon upon the same or some of the patents involved in that litigation, had he not, and the defense of that case was in behalf of Wm. Deering and others, as well as of the nominal defendants, was that not so?

A. Deering was sued as you state, and Deering & Co., but I think you are not correct in saying that it was in the interest of Deering or Deering & Co. I was asked to testify by Wm. N. Whiteley, who managed the defense in the interest of Wardner, Bushnell & Glessner, and particularly urged by Mr. Wm. Gamble to testify, as his company, Hoover & Gamble, had been sued, as you well know. As a matter of fact, Wm. Deering & Company's interests are likely to be affected by the result of the suit against Wardner, Bushnell & Glessner, and their interests are more or less affected by the result of this suit. I am here, as I was there, to testify as an expert, regardless of any interests I might have one way or the other. My

interests to a limited extent will undoubtedly be affected by the decision in this case, but as I am called upon to give my opinions, and particularly the reasons for any opinions I may express, I leave it to the court to say whether or not my reasons are sufficient to convince him of the correctness of my conclusions. As far as any statements of facts that I have made is concerned, I have made them under oath, and I trust that I possess sufficient manhood to testify truthfully whether such facts may be for or against me financially.

X Q. 38. Was any expert testimony taken in the Gordon case against Wm. Deering and Wm. Deering & Co., except that which was taken in the case against Wardner, Bushnell & Glessner?

A. Yes, the complainants completed their *prima facia* case.

X Q. 39. What I intended to ask was this, whether any expert testimony was taken for defendants in either of those cases except that testimony that was taken in the Wardner, Bushnell & Glessner case, and I will add the question, whether it was not well understood before you went on the stand that your evidence was to be applied in the Deering case as well as the Wardner, Bushnell & Glessner case?

A. To both parts of your question, no. There was no understanding about it, and I do not recall that I ever heard
144 any of the defendants speak of my testimony being stipulated into their cases; they may have done so, or thought of so doing, without my knowledge. The only conversation I ever had with Mr. Deering or with his attorneys in the matter was with Mr. Deering himself, when I stated to him that the parties wished me to testify, and he replied, giving his consent.

X Q. 40. Three of the patents sued upon in this case, issued upon applications filed by you as inventor, did they not?

A. Yes.

X Q. 41. You feel, at least, some fatherly interest in seeing them sustained and getting the credit of being the author of the inventions which they are alleged to cover, do you not?

A. The three applications I had in mind were the three Webster patents, and hence, not my invention. Patent number 272,598, I do feel rather proud of, because in it is found a successful attempt to give a grain-binder such an amount of brain as to automatically produce central placement of the band. That feature, however, is not in controversy. I find that I did not quite understand your previous question. I recall but one case of my own that I prepared the application for, and that is the one last mentioned.

X Q. 42. I did not ask what cases you prepared, but whether three of the patents involved in this litigation did not issue upon applications filed by you as inventor, and if this is not clear enough I will explain that I mean to ask if the applications were not deposited in the Patent Office in your name as the inventor of the subject-matter to which they related, irrespective of who may have prepared them preliminary to their being filed.

A. Yes.

X Q. 43. You do not take any pride in either of the three pat-

ents that issued upon those applications except number 272,598, do you?

A. I am not considered by my friends as possessing any pride. As far as pride would dictate I have absolutely none in this matter. Your question a moment ago may have created a slight flutter, if so, it has subsided.

X Q. 44. Patent 272,598 according to your theory, is an improvement upon the Olin patent, is it not?

A. I think so. I do not say that it is applicable only to the Olin device, except in most of its claims.

145 X Q. 45. Was Olin the first to employ mechanism for carrying the butts of the grain up the elevator faster than the heads, in order to straighten the grain, and cause the butts to catch up with the head?

A. No. C. W. & W. W. Marsh did that, but they did not deflect the grain for the purpose of central binding.

X Q. 46. Please look at letters patent, number 41080, granted C. W. & W. W. Marsh January 5, 1864, which I now hand you and state whether that represents the machines you have referred to in your last answer.

A. Yes, but the drawings do not seem to be quite clear.

The patent referred to is offered in evidence and marked Defendants' Exhibit C. W. & W. W. Marsh Patent.

X Q. 47. In this Marsh patent there is a broad endless apron on the inner or grain side of the elevator frame, to lift the grain over the main wheel and a narrower apron in front of the broad apron and parallel with it, and extending about its whole length, traveling faster than the broad apron, to lift the butts, is there not?

A. Yes, but I should hardly call D an apron; to be sure it performs the office of such.

X Q. 48. The broad apron D in the Marsh patent occupies the same position and serves the same function as the lower canvas or elevator apron in defendants' machine, does it not?

A. Yes.

X Q. 49. It also occupies the same position as the series of tooth belts M in the Olin patent, I believe?

A. Yes.

X Q. 50. Do you understand this apron D in the Marsh patent to be "one of the other forms of elevators than the one shown" referred to in line 57, page three, of the Olin patent?

A. I have no means of knowing what forms he refers to. This form has long been in use, however, and very likely what your quotation implies is true.

X Q. 51. Except that the pulleys of the butt belt, or butt elevator as perhaps you will permit it to be called, in the Marsh patent are arranged upon horizontal journals, and that the upper surface of the belt is flush, or nearly flush, with the upper surface of the main elevator or apron D, is not its location on the machine relative to the latter, the same as the location of the butt elevator Q to

146 the main elevator in the Olin patent when said butt elevator is

thrown forward so as to be parallel with the bar B of the elevator frame?

A. By no means. Olin's belt is placed vertical to the support over which the grain travels so as to have direct pushing contact with the butts of the grain. Even in the position you assume, it would have this effect to a limited extent. If you wish to know if the location of each is such as to operate upon the butts of the grain, yes, but they do not operate alike.

My employers for 15 years built this Marsh harvester, having the device mentioned in your question, and I was constantly in the field with it during harvest time, and know its operation.

Adjourned till January 5, 1888, at 10 o'clock.

Met pursuant to adjournment, January 5, 1888, at 10 o'clock. Present as before.

X Q. 52. My question assumed that Olin's belt was placed vertically and with its face acting against the ends of the butts, while Marsh's belt was placed on horizontal journals, and with its face flush with the surface of the main elevator apron. With these limitations and exceptions I asked you to state whether the location of the Marsh butt belt, upon the machine relative to the main apron was not the same as Olin's. I asked no question about the operation. Please answer my question with this understanding.

A. By no means.

X Q. 53. Then is it at the rear of the main apron in Marsh construction?

A. No, they are both in front, so are the double-trees. There is something more involved than mere fore-and-aft directions.

X Q. 54. Are they both in the position of the double-trees relatively to the main apron?

A. Yes, in so far as your previous question would call for. Both in front.

X Q. 55. Are you familiar with letter- patents number 45642 granted to Jacob Seibel December 27, 1864, for harvester droppers, and if so will you state whether a butt elevator moving faster than the main elevator is found in said patent?

A. I have often seen the patent and upon referring to it I find what is called a butt elevator, but it is not Olin's butt elevator, it is Marsh's butt elevator to which I have referred, and operates the same way.

X Q. 56. I did not ask you whether it was Olin's elevator
147 and can only surmise why you volunteered the information, but I will now ask you whether the butt elevator in the Seibel patent is not placed further back from the line of the guard-fingers than the butt elevator in the Marsh patent?

A. You need not longer surmise. I will explain to you a fact that I have learned. An attorney may frame a question so as to be capable of two or more meanings, and the witness may take it as meaning one thing and answer it. When the time comes for the

attorney to make his point (in his brief and in his argument) he may say that this and so, is what is meant by the question, and the witness has answered it as found, and in this way the witness may be shown to have said something that he never intended. I shall endeavor to make my answer- so clear that they cannot be capable of constructions other than to fit the question in all its meanings. Yes, slightly so.

Answer objected to, except the last three words, as irrelevant and impertinent.

X Q. 57. Is not the butt elevator in the Seibel patent located in the vertical plane of the front-platform sill, prolonged?

A. I think so.

X Q. 58. Now, supposing the butt elevator in the Olin patent to be arranged so that its upper end will be over, or nearly over the piece B for delivering long grain in proper position for binding purposes, as stated in the paragraph, commencing line 97, page three of the Olin specification, will not the butt elevator be in the plane of the front platform sill prolonged?

A. No.

X Q. 59. You mean to say that a vertical plane let fall through the front-platform sill and prolonged through the elevator frame would not pass longitudinally through the butt elevator in the Olin construction under the conditions stated in my previous question, do you?

A. You assumed that the part A at front of Fig. 2 indicates the line of grain travel. This is not true. There is nothing in the patent to show what A is any more than that it is part of the main frame. I do not find, in the Olin patent that its novelty pertains to the main frame. No description of it is made, but that "A, represents the main frame." The model-maker, or a draftsman, would throw in something, mattering little what, to support the parts forming the subject-matter of the invention. The part A is very wide, and, if the sickle were applied to its front face,
148 the line of grain travel would be further forward than even the foremost portion of Olin's belt Q. It is distinctly stated in the patent that the lower end *c*, of the belt elevator must be advanced in front of the line of the grain travel. The provision for the passage of the butts of grain is not made in Defendants' Exhibit Model Steward Patent, Number 191,264. A single frame-sill is carried through. This is equally true in Defendants' Exhibit Jones Model. Also true in Defendants' Exhibit Elward Model, Number 177,231. While in the Elward model 165,316 the provision is made. "Line of grain travel" was well known at the time of Olin's invention. It is shown in the Marsh patents, in one of which,—not introduced in evidence,—as I remember it, a special claim was made to the location of a part of the elevator in front of the line of grain travel, perhaps not in those words. At the time of the filing of Olin's application there had been built, to my certain knowledge, and shipped to various parts of the world, 25,000 or 30,000 of the Marsh machines in

which provision was made so that the elevator could be placed, or extended forward of the line of grain travel. Prior to Olin's filing, defendants, McCormick Harvesting Machine Co., had for several years, three I think, used an elevator extended forward of the line of grain travel, and when Olin says, that his elevator must be so located, it is perfectly understood. The draftsman who made these drawings showed no cutting apparatus and in fact has shown nothing whatever to establish the position of the line of grain travel. In view of the absolute knowledge of that position, at the time Olin's case was prepared, and that no description, nor exact showing of any parts not involved in the invention, is ever required in the Patent Office, I think the court will be warranted in ignoring the suggestive position of the heavier line in part A or whole piece in fact, because, the specification says it represents merely "main frame" and further, because, as stated, Olin defines the position of his belt as being "advanced in front" of a line absolutely fixed in the knowledge of all versed in the art, and all users of this class of machines.

The patent of Seibel, referred to in X Q. 55 and those which follow is offered in evidence and marked, Defendants' Exhibit Seibel Patent.

X Q. 60. I am glad that you so far agree with Mr. Renwick
149 as to admit that we cannot with safety determine from Olin's drawings and the specifications descriptive of those drawings the situation, function or purpose of the different parts of the frame shown therein, but would ask you whether, taking the construction shown in this second figure, and reading X Q. 58 with the substitution of the longitudinal bar marked A immediately over the signature of the inventor, at the bottom of the sheet, for the words "front sill" in that question, would not a vertical plane passing through said bar and prolonged to the left hand pass longitudinally through the butt elevator when it was in its extreme forward position parallel with the bar B as stated in the paragraph of the specification I have referred you to?

A. Regarding the first part of your question, the specification and drawings are addressed to those versed in the art. Many parts are omitted because of being understood. Mr. Renwick did not understand the essentials. I have but shown that the parts A are inessentials as far as this invention is concerned. In your question proper, you assume that the particular part referred to is the front sill. Upon your assumption I should answer one way, upon the facts I shall answer quite another. It is not the front sill; the patent says, merely, that it represents the main frame, which it does in fact, as far as is necessary, as stated. It cannot at the same time be the front sill and finger bar, because in this form of harvester they cannot be made to be in line. Without departing from the simple forms of construction of frame, which have been adhered to, in all the harvesters known to me, the main sill and finger bar have not been made in one piece as shown in the Olin patent, Fig. 1. Turning to Defendants' Exhibit Model of McCormick's Machine, it

will be observed that the finger bar is spliced to the front sill, the latter passing diagonally thereto. They are usually made as in the Elward model 165,316. This was a common form before Olin. In fact the only form that I know of. If I accept your assumption that it is actually the "front sill" then my answer will be yes.

X Q. 61. In your answer to X Q. 59 you refer to a Marsh patent which has a special claim to the location of a part of the elevator in front of the line of grain travel. Please look at reissue letters patent number 6223 granted to Chas. W. Marsh and W. W. Marsh, filed December 10, 1874, being a reissue of letters
150 patent number 41080 granted them January 5, 1864, and already offered in evidence in this case, and state whether that is not the Marsh patent to which you had reference.

A. Yes. With this patent at hand I can explain what I meant in the last preceding answers about the line of grain travel. This belt F is designed to engage the butts of the straws from below, and move them upward, this of course it would not do, unless the grain projected as far forward as the belt is. Now Olin shows that the face of his belt Q must come in such position as to act directly upon the butt ends of the straws. The rear face of his belt then would be forward of the line of teeth in this patent and his piece B which supports his elevator, being immediately beneath it, its whole width would be forward of the finger bar as shown in this Marsh patent. Reissue of letters patent referred to offered in evidence and marked Defendants' Exhibit Marsh Reissue.

X Q. 62. The belt F to which you have referred in the Marsh patent, is the butt-elevator belt which we have considered in connection with the original Marsh patent, is it not?

A. Yes.

X Q. 63. Now please look at letters patent No. 21207, granted C. W. & W. W. Marsh, August 17, 1858, which I now hand you, and say, whether a plate or board H does not extend from front to rear of the elevator, and practically from top to bottom, to protect the grain from the wind, and at the same time keep it on the teeth of the elevator rake, and yield or give as circumstances may require, as described in the first column of the second page of the specification of the patent.

A. Yes. Reverting for a moment, the necessity of placing the elevators in frame forward of the line of advance was shown by machines constructed in accordance with this patent. It will be observed that the pins $H^1$ are far in rear of what I have shown to be the line of travel of *of* the butts. In 1859, or '60, possibly '58, I saw a machine at the home of C. W. & W. W. Marsh constructed with the main frame as here shown, that is to say, so constructed as to make no provision or room for the passage of the butts. These machines—twelve in number, as I was informed—were failures on this account. The necessity thus shown led to the later machines which were built by my employers and worked upon by myself substantially in accordance with the '64 patents.

151 X Q. 64. Look at patent No. 142,331, granted to J. H. Garnhart, September 2, 1873, and particularly at the floats

or pressers P P and R in the first figure of the drawings, and say whether or not such floats or pressers over the main elevator to hold the grain to the elevator rake, were not known in the art, in the period from 1873 to 1875, and describe their construction.

A. Yes, and long prior to '73. I do not think from the arrangement of the pieces R that this device was designed to float, that is, to rise and fall, but they were well known from the time the earliest Marsh harvesters were put out. The arrangement of this float was such as to hold the grain sufficiently in contact with the elevators as to be moved thereby. It simply pressed the grain against the teeth so that it should not rise therefrom, and thus escape the said elevating teeth. As far as my knowledge goes, these were of slats, as shown in this patent. For the simple purpose of holding the grain down, only slats were needed, but in order that the grain should enter beneath this float, a cross-board at the bottom was used. This cross-board was at one time made so wide that it reached nearly to the top of the elevator before the fingers were applied. About as far, in fact, as the letter R is shown to be in Fig. 1 of the Olin patent. As bearing on the Olin patent, I do not consider that the wide cover which I have just mentioned cuts any figure, because there was no adjustable elevator acting upon the butts of the grain that necessitated anything to limit the vertical space through which the butts passed in order that it might operate. I spoke yesterday of the board R being new, so it was. The board I have mentioned, which was in fact made before, was but a widening of the lower piece to which the slats in the Garnhard patent are shown as attached.

The patent referred to is offered in evidence, and marked Defendants' Exhibit Garnhart Patent.

X Q. 65. Referring to Fig. 1, of the Olin patent, what does the outer dotted circle at the upper left-hand corner of the figure represent?

A. The gear which drives the belt Q.

X Q. 66. Do you not find that dotted circle lettered K, the same as the drum or roller K, in Fig. 6?

A. No.

X Q. 67. Now measure the inner dotted circle in Fig. 1, and I have brought two magnifying glasses which you may use if
152 you desire, and say whether it is not the same in diameter as the bevel gear *h*, in Fig. 6.

A. Yes, but I find that the figures are not on the same scale, hence that is no criterion.

X Q. 68. I have not asked you for a criterion, but to make the measurement, and give the answer.

A. You have my answer in the first part of the preceding.

X Q. 69. Leaving out your theories as to scales, I ask you whether upon measuring the diameter of the inner circle in Fig. 1, and the diameter of the bevel gear *h*, in Fig. 6, as they are shown in the drawings, do you not find the measurements the same?

A. I think they are.

X Q. 70. What does the inner circle in Fig. 6 represent?

A. The gear *g*, I think.

X Q. 71. Please measure the diameter of the gear *h*, and then the diameter of the gear *g*, both of them in Fig. 6, and state which has the largest diameter, as they are represented?

A. I cannot tell, as they are inaccurately drawn. If the inner circle *g* were correctly represented, that is to say, if its centre was in the right position, the said circle would strike the pinion *h* at exactly the same point on the length of the teeth along each side. It will be observed that it does not do —. Perhaps it is because the figure is slightly in perspective, but I think not; it looks more like the inaccuracy of a draftsman. It is, however, an inaccuracy more than likely to occur, because the gears are so extremely small. The same gears are shown in what seems to be their proper relative position in Fig. 4. This leads me to conclude that the line *g*, in Fig. 6, may not be intended to represent*ed* the gear which drives the drum.

X Q. 72. I think if you measure the outer circle in Fig. 1, you will find it would be subjected to the same criticism, if you consider it as representing the periphery of the bevel gear *h*. Try it and ascertain if it is not so.

A. Perhaps so, possibly also the outer circle represents the roller K. I think not, however, because the belt M is not tangential thereto. It seems to lack about half the thickness of the belt. To so split the belt, is much like splitting hairs, and these measurements are necessarily so, because of the smallness of the figures, and because of the inaccuracy of the lines which I have referred to.

153 X. Q. 73. In making the calculation upon which you based your statement on page 39 of the typewritten record, that upon referring to Fig. 1, of the drawings, you found the increased speed of the butt elevator over the main elevator, did not differ much from 25 per cent, did you take the outer or the inner circle in Fig. 1 as the basis of your figures?

A. The outer one, but I at the same time interpreted Fig. 1 by referring to Fig. 2, and perhaps should have said so.

X Q. 74. If the line *g*, in Fig. 6, is not intended to represent the gear which drives the upper drum of the butt elevator, what is it intended to represent?

A. It must be—undoubtedly is—designed to represent the flange not lettered, but immediately adjoining the same letter, in Fig. 4, which is also shown in Fig. 1, and is, without doubt, designed to form a guide for the lower edge of the belt Q.

X Q. 75. Then what is the inner circle in Fig. 6 intended to represent?

A. Probably the surface of the drum *d*. There seems to be some confusion in this matter, but it is made clear by the specification which says, "the butts of the grain are heavier than the heads, and consequently lag behind, unless some means are provided to make them move faster than the heads." In order to elevate the butts even with the heads he makes the necessary provisions. He also uses the words in the clause before his statement of invention, that

"the butts of grain shall be carried up parallel, or nearly so." Construing the deviations from accuracy, (inevitable in drawings so small) in a way to make the device operative, as a mechanic versed in the art would who wished to avail himself of the invention, and not construing them in a way to defeat such an effort, and, viewed in the light of the specification, the drum *d*, will be found, I think, to be moved faster at its surface than the elevating belts are driven. At the time of Olin's application the tendency of the butts to lag behind was well known as shown by the Marsh patent of 1864, in which the special belt for advancing the butts is described and claimed.

X Q. 76. Now that you have got in an irresponsive argument as a supplement to your reply to my last question, please tell me for how long a time you have been familiar with the rules of the
154 Patent Office promulgated by the Commissioner of Patents with the approval of the Secretary of the Interior.

A. Are you not joking?

X Q. 77. Considering the nature of the evidence that you have given perhaps you are justified in thinking that I enter into the humor of the thing, but nevertheless I wish a reply to my question.

A. If you mean how long have I been familiar with the rules of the Patent Office; that you could have asked in very plain language. If that is what you mean, I have had to do with the Patent Office about 20 years.

X Q. 78. And during that time you have made it a business to be familiar with the rules of the office, established by the Commissioner of Patents with the approval of the Secretary of Interior, have you not?

A. Somewhat, but my experience in working from Patent Office drawings and being guided by the specifications thereof, has been such, that I have learned that they can never be taken as accurate. Specifications are also often badly written, but as they are directed to those versed in the art, I consider them sufficient in the majority of cases, and in my interpretations of the Olin patent, which you seem inclined to slur at, I feel quite sure I have not gone beyond the bounds of reason. As a matter of fact I have been more ignorant of the "rules of the office" than I have been of mechanics and of the art, I hope.

X Q. 79. Do you not know, that ever since the time, prior to year 1877 a rule of the Patent Office established by the Commissioner of Patents with the approval of the Secretary of the Interior has been enforced requiring that like letters shall refer to corresponding parts in different figures of the drawings accompanying the application for patent?

A. Yes, and many other rules have been established which like that, have not been adhered to. I have admitted that certain figures of the Olin drawings are not clear. I am aware also that J. G. Parkinson was examiner at the time that Olin's drawings were filed. If Olin's drawings are not in accordance with the Patent Office rules, then my questioner, the same J. G. Parkinson, is wholly

responsible. I do not agree with him now, but I agree with his opinion then, that the specification and drawings are in such clear and exact terms as to enable one versed in the art to under-
155 stand them. At the time of the filing of the Olin application the said J. G. Parkinson, examiner, should have been, and I believe he was a wholly disinterested party. Whether so or not now, he may not be equally so. Regardless of the rules of the office, I do know that mechanics have rules (those of common sense) for guiding them in their interpretations of such drawings and specifications.

X Q. 80. With the endorsement you have given me in your last answer, you will doubtless admit that the circle *g*, that is, the outer circle in Fig. 6 represents the periphery of the bevel gear *g* shown in Figs. 1 and 4 of the Olin patent?

A. I endorsed you then, when you were disinterested, I cannot endorse you now for the same reason. In Fig. 6 there are two circles and two small *g*'s. I incline to the opinion, as I said before that the outer circle represents the flange *d*, and the inner circle the gear *g*, but this is the circle that I complain of as being somewhat out of its position.

X Q. 81. In practice what is the range of movement of the swinging end of the butt adjuster in shifting from the longest grain to the shortest and what is the average range?

A. They vary very much. The amount shown on defendants' Winona machine and defendants' McCormick model are about the usual distance, from 7 to 10 or 12 inches.

X Q. 82. Suppose you describe the direct fore and aft line as a tangent to the drum at the swinging end of the butt adjuster in the Winona or McCormick machines, when it is adjusted for the longest grain, how far away from the tangent will it be swung in its adjustment for the shortest grain?

A. The lower end draws up two inches, if that will meet your question. I have only the Winona before me. Not knowing the exact proportions of the McCormick model, I cannot say what the retraction of the lower end will be. The amount of retraction depends of course upon the *the* length of the arc described by the lower end, and by the radius of the arc, that is, the length of the adjuster, which strikes it.

X Q. 83. The shaft W in the Olin patent may for the purpose of measurement be considered a tangent to the upper end of the butt elevator, may it not? If so, how far away from the line of that shaft will the butt elevator swing in its extreme adjustment for short grain?

156 A. To the first part of your question, yes, to the last part not at all, of course. The shaft W forms its guide, the upper roller of the butt-adjuster Q moves in a right line parallel with the shaft W.

X Q. 84. I find on page three, lines 12, 13 and 14 of the Olin patent the statement that as the upper end of the belt or elevator is carried in or out it will describe an arc of a circle, is that statement true?

A. Strictly so. The arc of a circle is struck either by an imaginary line, or a real line by something which moves on a centre. Now the frame *e* is moved upon its lower end as an axes: the arc of the circle in this case has for its radius the length of this frame *e* (between centres of the two drums). By an extraneous force (the upper shaft, W) that of the small drum *g* it is moved in a straight line. This seeming incongruity is plain enough, and I can make the whole matter clear by comparing it with the motions of the earth. Its orbit is an ellipse, but nevertheless, in one hour's time we travel on the arc of a circle to the extent of not far from a thousand miles. Olin states that his butter Q may be driven at its lower end. In that case, as now the lower end would form a pivot, and then, the shaft W being removed, or rather the gearing which moves the butter, from the shaft, the latter would not affect the adjusting device, so as to give its upper end a right-line movement, as well as a movement *as* an arc of a circle, with the lower pivot as an axes.

X Q. 85. Do you find any provision for telescoping in the frame *e* which at its lower end has the bearings of the drum *c* and at its upper end one of the bearings of the drum *d*, of the butt elevator?

A. Certainly not, for that would affect the length of the belt every time adjustment was made. Referring to Figs. 1, 2, 4 and 5, it will be observed that the frame *e* is let into the piece B immediately below it, and is held into that space by the clip *x*. Reference to Fig. 5 will show that the lower end of the bar *e* is limited from sidewise movement. Now, as the adjusting belt Q is moved inward at its upper end the lower end simply draws upward in its recess.

X Q. 86. Where do you find any authority in the specification of Olin for the statement that the lower end of the frame *e* is permitted to draw up and down in its recess?

A. I was reading the drawings. They are perfectly clear.

157 The maker of Defendants' Exhibit Model of Olin Patent, evidently understood the matter, because he has constructed it with the slot that I have mentioned, but I notice that he has passed the axis of the pinion down into the piece B. Fig. 4 of the drawing shows very clearly that the axis $e^1$ does not pass down into B. At the top of column 2, page 2, of the Olin patent are these words: "This piece *e* may be located in a groove, $e^1$ formed in the piece B, which groove is of such form as to permit the piece *e* to move backward and forward, or may be located directly on top of the piece B." "The shaft $e^1$ of the wheel *e* has its lower bearing in the piece B and its upper one in the cap of the bent-up bar *f*, which bar or cap is permanently secured, as shown to the bar or cap *e*. This shaft $e^1$ also forms a pivot for the bar or cap *e* to swing on." I do not construe this to mean that the lower end of the shaft $e^1$ is journalled in the bar B and the upper end of the cap *f*, but that it may be there simply as a pivot for the frame to rock on. Otherwise the device would be inoperative. In Fig. 5 the bar *e* is shown, the bent-up piece *f* being removed. In this part *e* a round hole is shown at the bottom, which is undoubtedly the journal bearing for the shaft $e^1$. The drawings are clearer than the specifications.

Adjourned till tomorrow, January 6, 1888, at 10 o'clock a. m.

JANUARY 6, 1888—10 o'clock a. m.

Met pursuant to adjournment.
Present as before.

X Q. 87. Do not the figures 2 and 5 show the upper end of the shaft $c^1$ journalled in the upper end of the piece — of the butt-elevator frame?

A. No; 2 and 4 do.

X Q. 88. Do you find in the specification itself any description of means for enabling the upper end of the butt elevator to move in the right line parallel with the shaft W, as stated in your answer to X Q. 82?

A. Yes. I quote from the patent, "*i* the sliding head or journalled support for the mitre wheel *g*." This piece is shown in Figs. 4 and 6, as surrounding the shaft. Then again, "On the shaft W, and sliding thereon, is a piece of metal *i*." Still further I find, "In the outer arm of this sliding head *i*, is the journalled bearing for the lower end of the shaft $d^1$ of the pulley or wheel *d*, for the
158 upper end of the chain Q, so that as the head *i* is moved back and forth on the shaft the upper end of the belt Q must be carried with it, by reason of the journalled bearing for the shaft $d^1$ being in the sliding head."

X Q. 89. And I understand you to say that if the lower end of the butt elevator vibrated on a fixed pivot in this movement, the upper end would be drawn away therefrom stretching the belt, and resulting in an inoperative device; am I correct?

A. Partly, but for the parts *d* and *f*, there would be such drawing away.

X Q. 90. How do the parts *e* and *f* prevent such drawing away, supposing the lower end of the butt-elevator frame be journalled upon and vibrated around such a fixed pivot?

A. What fixed pivot? I have not heard of any such thing.

X Q. 91. I used the term in my last question, and you answered that question, and you very well understand what I mean, but I will say that I am supposing, and wish you to suppose if you do not find it very clearly indicated in the specification of Olin, that the pivot $c^1$ is mounted in the part B, so as to have no endwise movement.

A. Your question is confused, make it plainer, please.

X Q. 92. In X Q. 89 I said that I understood you to say, that if the lower end of the butt elevator vibrated on a fixed pivot, in this movement, (referring to your last answer,) the upper end would be drawn away therefrom, stretching the belt and resulting in an inoperative device, and I asked if my understanding was correct. You replied that it was partly so, but for the parts *d* and *f*, there would be such drawing away. I again asked how the parts *d* and *f* would prevent such drawing away if the pivot was fixed, as assumed in the question preceding that one. I would like to have an answer to this, if I have made it sufficiently plain for your comprehension.

A. I find that my answer to X Q. 89 says, "but for the parts *d*

and *f*," I did not say *d* and *e*. Evidently the typewriter did not catch it correctly.

X Q. 93. Assuming the non-extensible parts *e* and *f* to be journalled at the lower end upon a pivot $e^1$ having the bearing in the piece B incapable of lateral movement, how would the upper end be able to move in the right line instead of the arc of a circle described from the point $e^1$ in the adjustment of the butt elevator?

159 A. It would be necessary in that case, that the bearing of the pivot $e^1$ in the bar B, be a sliding bearing; such a sliding pivot would be an exact equivalent of that shown in Fig. 4, where the foot of the bar *e* is prevented from lateral movement by the closeness of the recess in which it moves. I have not discovered in the specification that the word "bearing," in this connection, means anything more than something to control the foot of the frame *e*, so as to make the device operative in such a way as to make the device operative as a whole.

X Q. 94. Undoubtedly something is needed to make the device operative as a whole, but my question assumed that the pivot $e^1$ was not mounted in a sliding bearing, but on the contrary, was prevented from lateral movement, and I wish a direct answer to the question, whether such a device would be operative with the shifting and driving mechanism described, or not. By the shifting and driving mechanism, I mean the shifting and driving mechanism shown in Figs. 4 and 6, and specifically described in the Olin specification?

A. No. You demand a direct answer—you have it. You shall now have a correct one for, assuming, as you do, that the pivot is fixed at the bottom; your question calls for much more. I have stated that the device is operative. Your question, questions the correctness of my statement; am I not then called upon to answer that? The Olin patent, as far as it has been here considered, are two office copies, one introduced by defendants. I do not doubt its correctness in as far as it goes. It is a reduced photo-lithograph copy. The lines are, of course, not as distinct as the original from which it was taken. It seems to be somewhat confused, yet I think it clear enough to support my construction of the patent. You, as principal examiner in the class harvesters, having full charge of all matters pertaining to the examination and allowance of applications in this class, passed it. You had the original drawings before you, and, under those circumstances, I place more confidence in your judgment as to the sufficiency of the specification and drawings than I can even in my own now, with but the reduced photo-lithograph copy. Such is human nature, that (as there is a possibility, that self-interest might "the quivering balance shake,") I must, as I have said, place more reliance in your undoubt-

160 edly unbiased action then, than in my own judgment now, and your judgment, which you have put in the form of a question. Your statement so made, ("undoubtedly something is needed to make the device operative as a whole,") is your judgment now. I consider that to call for an answer, which I will give, as

that of a mechanic versed in the art, and one having had much experience in making and reading drawings and following Patent Office drawings. The patent, in my opinion, is clear, to be sure there are inaccuracies, but they in no way affect the operativeness of the invention. In order that those versed in the art may avail themselves of the patented invention, it is but necessary that the patent should be sufficiently clear for them to follow. If in fact, it is not, and such deviations from the patent as are only common expedients, are found necessary, then I say the patent is clear enough for a mechanic.

X Q. 95. I hope that you have not depended upon your imagination for your facts, throughout your whole examination so much as in your last answer. If you will refer to the certified copy of the file-wrapper and contents of the Olin patent, which is in evidence, you will find that my connection with the application ceased before it was allowed. I mention this to set you right, and abbreviate, if possible, your future answer. I will now ask whether, supposing the upper end of the butt elevator in the Olin patent constrained to be moved in the arc of a circle in its adjustment back and forth, the shifting and driving mechanism shown in Figs. 4 and 6, and specifically described in his specification would be operative.

A. I have not drawn from my imagination. It is a matter of absolute knowledge to me, that you were principal examiner as I have stated, from before to long subsequent to the filing of the Olin application. My familiarity with office practice has taught me that the drawings are passed upon first, and any incorrections in the specification are made known to the applicant. When corrections are made, except in the matter of trivial ones, the case is then examined upon its merits. Turning to the copy of the file-wrapper and contents which you have mentioned, I find that on the 1st day of December, 1877, thirteen days after the date of filing, you acted upon the case. Another letter was written by the office February 23rd, a third one November 19, 1878. On November 26, '78,
161 there was still another letter. The last two of these letters are signed by J. G. Parkinson, ex., the others have his endorsement in precisely the same way. I fail to find in any of these letters a single word pointing out any inaccuracies in the drawings or specification, or in any way hinting that the inventor's rights are insecure because of such discrepancies. In view of my knowledge, (to a limited extent,) of the duties of a principal examiner, I am not drawing upon my imagination, when I say now, that in my humble opinion, when the court comes to consider this set-to, if he thinks there are evidences which incline him to the belief, that I am prejudiced, what must he think as to the prejudices or otherwise of the examiner (the mediator between the interests of the inventor and those of the public) who permits an application to pass through without criticism and then for money from an interested party attempts to break down that very patent. I will explain that the question does not directly call for these statements but they (the questions) are somewhat assailing in their tone.

Nor do I draw upon my imagination in saying that the Olin

application was ready for allowance prior to the withdrawal from the Patent Office of the said J. G. Parkinson, because as seen by official letter of November 19, 1878, the Olin application was held from issue because of a pending interference. To be sure you may have withdrawn as you state before the final allowance, but this letter shows that it was not before the duties of examiner thereof had ceased. All of these matters, which are brought in, are distasteful to me, and I shall be pleased to have my examination continue in a straightforward way. Answering the last part of the question, I will say, if the things which you suppose, are true, then the device would be inoperative, but your suppositions are not correct.

X Q. 96. I find on page three, of the Olin patent, commencing with the twelfth line the following statement: "As the upper end of the belt or elevator is carried in or out it will describe an arc of a circle, so that the pulley *d* will be carried up and down slightly, carrying with it the gear wheel *g*. The sliding head *i* must, therefore, be so arranged and connected to the shaft W and the devices for sliding it that it will be self-adjustable, in order to allow the upper end of the elevator or belt Q to operate." Now I will
162 ask how the sliding head *i* is self-adjustable?

A. The quotation may be explained in this way, while it is absolutely certain that the frame *i* must move in a right line, because it slides on the shaft W, that may not be necessarily true, with the top of the bar *f*, at $d^1$. I do not find anything to show that the frame *i* is connected with the bar *e* at the top. Clearly, in my opinion a good mechanic would have so made it. Suppose for the moment that the piece *e* and *i* are not constrained to move as one piece, and also suppose that the axis $e^1$ has absolutely no sliding movement in the bar B, then, although the frame *i* would move in a right line the uppermost bearing of the shaft $d^1$ would move in the arc of a circle. While this construction was undoubtedly the best one which Olin could suggest at the time, it seems to me that a better mechanic would have made the parts *i* and *e* as one. Making them as I have assumed to be possibly correct, in view of the quotation, there would be a cramping action in the bearings of the shaft $d^1$ and the strict parallelism of the pulleys *e* and *d* would not be preserved. This defect, if my possible construction is a true one, is overcome by making the pulleys *e* and *d* with faces extremely crowning. Where pulleys are strictly parallel their faces may be straight, but where subject to possible departures from parallelism they are extremely rounded so as to compel the belt to travel upon them. The amount that the pulley *d* would be drawn out of position would not be very great in a machine having an adjusting belt as long as Olin's and hence what I take to be your construction would be operative as well as mine. I think mine is not a departure from the patent and think you will agree with me that it is the most mechanical one.

X Q. 97. Where in Olin's specification do you find a description of such an arrangement as you have supposed in your last answer?

A. In the lines you quoted from.

X Q. 98. Supposing the pulleys to be rounded or crowned, as you have suggested, will not the selve-ges of the belt necessarily be slack, in the construction which you have just proposed?

A. Not necessarily, the principles involved in running pulleys out of line are not understood in a moment. It would be true, and it would not be true. I can make this clear, I think, by the statement that the belt tends to run to the highest point of the pulley, whether the shafts are in line or not, if the pulleys are sufficiently crowned. The lack of parallelism between the shafts would cause the belt to tend to run off in the direction of the point of intersection of the two shafts. This would be counteracted by the crown of the pulleys, and should the said crown and angular direction of the shafts be just right, one edge of the belt would be the tightest portion, and the other slack. If, however, the shafts were placed parallel, then, as you say, the selve-ges would be slack. My statement, that a belt inclines to run off toward the co-inciding point of the two axes, does not correspond with the views expressed oftentimes, that a belt runs to the high side of a pulley, or to the highest point, whether the said pulleys are parallel or not, but I trust that you do, and the court will understand it as correct.

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X Q. 99. Under the conditions of the preceding question and answer, if the upper end of the shaft $d^1$ moved in the arc of a circle, and the lower end tangentially to said arc, would not the space between the crowns of the two pulleys be increased and decreased in the back and forth adjustments?

A. Yes; but you remind me that I omitted to say that the shaft $d^1$ if made simply a cylindrical pin secured tightly in the part $f^1$ and at its bottom end to the frame $i$, the sliding of the frame $i$ upon the shaft W, would draw the frame $e$, upward (if permitted to slide, which is the proper construction) and thus no tipping action of the pulley could take place. In this case the gear $g$ and pulley $d^1$ would be as one piece. I have made adjusters in that way, that is to say, with the shaft $d^1$ fixed, and the gear and pulley revolving on it. I am aware that the specification says that the shaft $d^1$ has a journalled bearing in the frame $i$, and also that its upper end revolves in a journalled bearing. If the device was constructed in the form which your supposition is founded on, there would be a tipping effect upon the pulley.

X Q. 100. Where in the Olin specification do you find a statement that the proper construction requires that the frame $e$ be permitted to slide?

A. I do not think I was quoting from the specification, on the contrary, I think I said that I was reading from the drawings. All I find is at the top of column two, page two.

X Q. 101. You mean the sentence, "this piece $e$ may be located in a groove $e^1$ formed in the piece B, which groove is of such form as to permit the piece $e$ to move backward and forward," do you?

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A. Yes, but you will observe that it cannot move at the lower end, but is free to slide up and down.

X Q. 102. I do not observe that, but will ask you whether the words, "backward and forward," in this sentence, are used in their ordinary significance in the English language, and in the same sense as they are used on line 97, page two, or whether they are used in some different sense?

A. I presume so.

X Q. 103. What do you presume?

A. That they are used in the ordinary sense of the English language, although I cannot consider the specification as showing any very high degree of art in the use of the English language.

X Q. 104. When did Wm. Deering begin to build grain-binders with swinging butt-adjusters for the market? By butt-adjuster I mean endless belt butt-adjusters, or butter aprons.

A. For the harvest of 1879.

X Q. 105. Whereabouts on the machine did he place these butt-adjusters?

A. On the decline of the elevator, the same as defendants', McCormick, did two years later, when they followed him on the market with the Appleby twine-binder. In the same position exactly as the Winona Company did, who substantially copied his machine in 1884.

X Q. 106. Did Wm. Deering purchase the Olin patent by your advice?

A. He held a half interest in the patent by some arrangement with Olin, and purchased the remaining half by my advice.

X Q. 107. Did Wm. Deering ever build a harvester, or a harvester and binder, and put it on the market, having an adjustable butter apron or butt-elevator located in front of the main elevator in the position relative to the main elevator shown by Olin in his drawings?

A. He did not, that I am aware of, put any such on the market. As explaining Mr. Deering's rights in this matter, taking this question and the previous one into consideration, I will say, that Mr. Olin was working for Mr. Deering on a salary at the time the invention was made. He came to the shops and built his first machine—the one from which the model was made for the application. This machine was built by Mr. Deering's mechanics,
165 and at Mr. Deering's expense, and was applied to one of Mr. Deering's harvesters, (I should have said Gammon & Deering in the matter of the mechanics and the machine they made). This was in 1877; that year we put out machines, one of which is the McElroy machine, offered in evidence. In 1878 a binder was put out that did not pack the grain, but was adjustable fore and aft for central binding. The succeeding year, however, machines were put on the market with the adjuster in the position shown in defendants' machine. I wish this to make the fact clear, that as far as my knowledge goes, Mr. Deering and Gammon developed and practically introduced the butt-adjusting device, as now found on the market.

X Q. 108. Was the machine that was built by Olin at the Gam-

mon & Deering shops precisely like the machine shown in the drawings of his patent?

A. It is possible that Mr. Olin had some changes made when the model was constructed, but I do not know of them. As far as I know the machine was like the drawings. It was a fully operative machine which I frequently saw and saw go to and from the field, but I did not see it in operation.

X Q. 109. What became of that machine?

A. It was returned from the field after a successful run, as I was informed by Mr. Olin himself, and others, was taken to a storeroom in that portion of the factory which was burned in the spring of 1879 (as I now recall it), and was destroyed.

So much of the answer as relates to the statements of Olin and others is objected to as hearsay.

X Q. 110. The machine represented in the Olin drawings is of the type known as the Marsh harvester, is it not?

A. Yes.

X Q. 111. And defendants' machines are also of that type, are they not?

A. Yes.

X Q. 112. Did you ever know a machine to be put on the market of the Marsh harvester type having a swinging butter apron, located in front of the main elevator in the position shown in the Olin drawings?

A. I think not. The Miller machine is the nearest.

X Q. 113. Referring to page 56 of the typewritten record, whereabouts in the Olin specification do you find him specifically stating that "he does not confine himself to any elevator," as
166 you have said at the end of the first paragraph in that page?

A. "The elevator or belt Q can be used with other forms of elevators than the one shown to accomplish the same result." These words are found, line 56, page three, and following.

X Q. 114. Is that a specific statement that he does not confine himself to any elevator, or is it not rather a statement that other forms of elevators than the one shown can be used?

A. Both. Defendants' form of elevator was then in use, as far as the carrying of the grain to the highest point is concerned.

X Q. 115. In order to ascertain the sense in which you use language I will ask you whether you mean to be understood as implying that Olin does not confine himself to the use of any elevator at all in the machine but intended to be free to omit the elevator altogether, by the statement which you have quoted?

A. It seems to me that the statement is perfectly clear and I acknowledge my inability to make it clearer. When he says it can be used with other forms of elevators, I cannot see how that can be construed to mean no forms of elevators. The patent is for a combination of his belt Q with some kind of elevator or conveyor that shall bring the grain within its reach. If used with no elevator

or other means for conveying grain it would not be the combination called for.

X Q. 116. Then by your statement on page 56 that Olin specifically states that he does not confine himself to any form of elevator, do you not mean that he proposes to dispense with an elevator altogether?

A. Certainly not. By any elevator I meant any particular form of elevator of course.

X Q. 117. Prior to November 17, 1877, did you ever know the term elevator to be applied in this particular art to any device that did not actually elevate?

A. Yes, the Marsh harvester elevator carried the grain not only up, but directly downward into a receptacle, not so far however as the Olin. We invariably call the whole part of that the elevator or elevating device.

X Q. 118. Do you mean that the Marsh elevator did not actually elevate?

A. No. I mean that it elevated up and then elevated down again.

X Q. 119. My question 117 was whether you ever knew the term elevator to be applied prior to November 17, 1877, to any device that did not actually elevate, confining yourself, of course, to
167 *to* this particular art?

A. I do not recall any such, unless the device did carry the grain from a lower and deposit it in a higher position.

X Q. 120. Supposing the machine to be horizontal from the divider end to the stubble end with no ascending incline or elevator, would the application of a swinging butt-adjuster apron to such a machine come within the terms of the Olin claims, in your opinion?

A. I certainly think it would, unless limited by the state of the art. It would certainly be an operative device; it would carry the grain from the receiving platform to the binder receptacle; it would carry the butts so as to move them parallel with the heads, and would also provide for central binding. I have yet seen no limitations imposed upon the Olin patent by the state of the art. There have none come under my observation in this case. I am clear in my opinion that a sweeping reissue could have been made of this patent at the time such things were allowed. I believe that the court is warranted in construing this patent, not perhaps in giving Olin latitude, but, giving him such breadth as the state of the art will allow, taking into account the fact that no actual limitations are found in it. I find no clauses in Olin's patent, like this: "I do not claim so and so," or, "such and such has been done before, and hence that I do not claim so and so." Olin has shown his device, and described it as shown. He has not described it as it might have been shown; he has not claimed it in a way not shown; in fine, his patent is what I might term a somewhat modest one. It does not "blow its own horn" as some men do (giving it a personality), but waits for its merits to be appreciated.

X Q. 121. Whereabouts in such a horizontal machine, as I sup-

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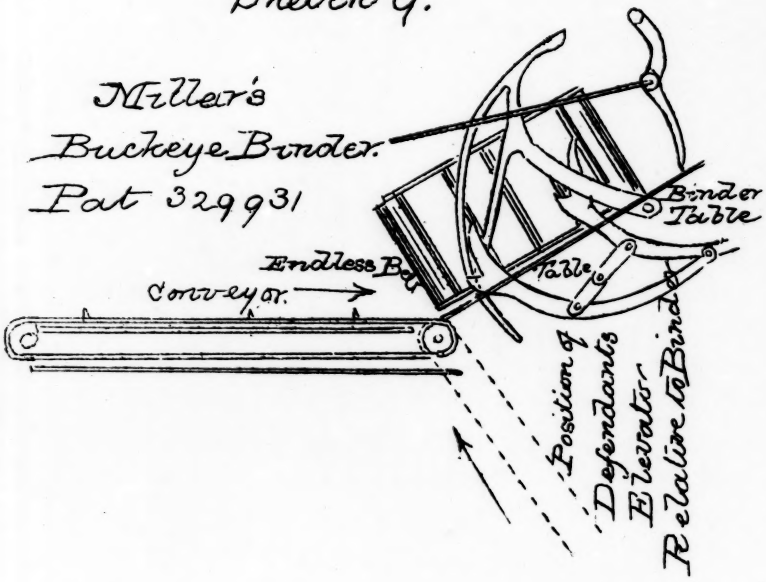
Sketch 9.



posed in the last question and answer, do you find the harvester elevator of Olin's first claim, and the main elevator of his second, third and sixth claim?

A. You are assuming a machine that does not elevate, and now you want me to say to you what part does elevate.

X Q. 122. That is precisely what I want you to say; can you answer me?

A. I did not couple your supposition with the claims. I now answer it with the two parts of the question as one. That part called for in the claims mentioned, would be that which co-
168 operated with the belt Q to straighten the grain, to even up the butts and to determine the position for central binding. That, if horizontal, would be simply a conveyor. If declined, it would be perhaps I may say a depressor; if inclined it would be an elevator as well. The operation would be exactly alike in every case. I I am sitting; am I less a man than when standing? That does not affect my individuality. Olin's conveyor is an inclination; is it any less a conveyor than if his machine were tipped up so that it would be horizontal? If his machine were tipped still farther, his conveyor would be a depressor. Now all of these changes of position that I have mentioned take place without any change whatever in the relative positions of the co-operating parts which form the subject-matter of all the claims sued on. One of the sketches number 9 illustrates what I mean.

(Here follows diagram marked p. 168*a*.)

It shows Miller's machine which does not differ from Olin's. If the paper is held so that the name Miller's, reads correctly, then I say it is like Olin's device. If the sketch is turned upon edge so that the other markings read correctly then, it is defendants'. In the latter case there is a change of position, or rather of incline in such part of the conveyor as brings the grain within reach of the butt-adjuster. As long as all of the elements of the claims operate in exactly the same manner and each adds its mite to the general result, I cannot see what limitation the word elevating is, when as a matter of fact it is, and must be a conveyor, or else the device will not be what it is.

X Q. 123. In your answer number 120 you say that in your opinion a sweeping reissue could have been made of the Olin patent at the time such things were allowed; please state for what this reissue could have been obtained.

A. I cannot state plainer than I have already done, in the construction which I have given the Olin patent. Do you wish me to frame some claims that might have been allowed?

X Q. 124. You may do so if you please.

A. Properly construed, that is to say, construed in the common-sense manner that unprejudiced persons would construe them, the Olin claims are broad enough. I do not think I could have drawn any claims better fitted to cover any possible forms that might follow than those that were drawn in the interference proceedings

which I have referred to. If I should say the issues in those
169 interferences were strong, that would not be saying that I consider Olin's claims weak. Some claims might be drawn that would conform more strictly to the dictionary than to the machines. As for instance, in many of the reissues taken out by S. D. Locke.

X Q. 125. Now, referring to that pleasant little trip to Williamsburgh, if the breaks had been put on the train at the foot of the Western slope of Alleghenies, and kept on, do you think you would have reached Williamsburgh?

A. That would have depended upon the power of the engine as compared with the resistance.

Adjourned till tomorrow morning, January 7, 1888, at 10 o'clock a. m.

JANUARY 7, 1888—10 o'clock a. m.

Met pursuant to adjournment.

Present, as before.

Cross-examination by Mr. DYRENFORTH:

X Q. 126. Will you please state concisely your exact duties in the business of Wm. Deering?

A. As a mechanic, I aid in improving the machines. Incidentally I have invented a large number of the improvements which have been applied to the machines. My special department, however, is that of looking after patent matters.

X Q. 127. Are you the patent solicitor for the corporation, and have you charge of all the patent lawsuits and interferences in which the corporation becomes involved?

A. Yes. As I have not time to attend to them all some of the applications are in the hands of other attorneys, yet I look after them.

X Q. 128. Your answer, yes, applies to *to* the patent lawsuits and interferences, does it not?

A. Yes.

X Q. 129. Are you the only patent expert connected with the Deering corporation?

A. Yes.

X Q. 130. Is Mr. Deering, himself, an expert in harvesting machinery?

A. He claims not to be, yet I consider him a good judge as to the general results attained by machines in operation.

X Q. 131. Is Mr. Deering an expert in patent matters?

A. I think not.

170 X Q. 132. Then in all such matters he relies upon you, does he not?

A. Largely, I think.

X Q. 133. Then when prosecutions are instituted by the Deering corporation, or Mr. Deering for alleged infringements of patents you are the prime instigator, are you not?

A. No, I will explain this matter. The said corporation, with

Mr. Deering at its head, is in the business of manufacturing and selling harvesting machinery. It meddles only in patent matters for its own protection. Although Mr. Deering and the corporation control between fifty and a hundred patents for late improvements, many of which are infringed by our competitors, but one suit has ever been brought, and that is against the Winona harvester works. I think I have previously explained that suit was brought against them because they had constructed, substantially, the machine, and among other things had appropriated the knotter which was the great selling point of the Deering machine. Because of the damage done to the concern by such use of the knotter and because of the Winona Company refusing to make any change,—refusing to desist,—another bill was filed including other patents than those covering the knotter. The McCormick Harvesting Machine Co., is also concerned in this suit, as a defendant by their own acts, they having compelled Wm. Deering by a process which the court will remember to make them codefendants, and hence, I have ignored this McCormick matter in saying that the corporation, or Mr. Deering, have never brought but one suit. As far as I know, having charge of these matters, subject, of course, to Mr. Deering, it is not their intention so to do. Neither Mr. Deering nor the corporation are litigious.

X Q. 134. Then the commencement of the second suit against the Winona harvester works was purely vindictive, and not for profit or speculation, is that true?

A. Your question leads me to think that you have misconstrued, or you misunderstood what I told you the other day when in friendly conversation. What your question calls for is not true. The suit was brought with the hope that we might be able to recover damages, or recover part of the damages that had been inflicted. I do not think that this suit could terminate in such a way as to make good the damage that has been done Wm. Deering, and Wm. Deering & Co., by the acts of the Winona harvester
171 works. I have had their own agents—at any rate men who represented their machines, tell me that the Winona machine was "just like the Deering: that it was copied right from the Deering: the only difference being that it was better made, and better material was used in it." I have with me, I think, many letters of complaint from our agents, saying that the Winona concern was selling substantially our machines at a lower figure. I can show you these letters if you wish. As I have said, Mr. Deering cannot hope to recover full damages, because the trade has been so seriously affected in matters that would not be cognizable, as I suppose in patent law, which I yet insist should be cognizable. I am not, however, an authority in this matter.

X Q. 136. What you said to me in friendly conversation a few days since, as I recollect it, was, that owing to the feeling that had been aroused on the part of yourself and your associates in the Deering corporation, by the act of the Winona Company, in adopting the worm knotter, the intended litigation upon the Olin patent, and certain other patents involved in this controversy, was

begun against the Winona Company, intead of against some larger, wealthier and older firm or corporation. Is not that substantially what you said?

A. I was led by your last previous question to think that you misunderstood me. I now see that I was right in my conclusion. It has never been the intention to bring any suits against anybody for infringing any patents. I stated to the Winona people, when I went to see them, that they must cease using our knotter, but that the other patents we would permit them to avail themselves of, because others were already using the devices. I further stated to them, and I think I have said to you, that all of the large manufacturers have patents which they think are infringed by other competitors; that, in our opinion, these patents were infringed by others, and that, if such were true, the time might come when the matters would be evened up. When we became compelled to file the second bill in the Winona case, with the hope that we might be able to recover damages, we included the Olin patent. We are not litigious. We tried to come to an arrangement with the McCormick Harvesting Machine Company, but did not succeed in so doing. I think that Mr. Deering would prefer now to sacrifice something rather than to have this litigation to go on. He is not aggressive
172 in his methods, and this matter is far from being pleasant to him. I recall that I told you that it was principally in accordance with my judgment that Mr. Deering brought the second suit.

X Q. 136. Do you mean to say, that if the United States circuit court for the district of Minnesota, should place upon the Olin patent the construction for which you and your associates asked, and sustained the patent under that construction, and hold the Winona machine to infringe it, no demand for compensation would be made against other manufacturers using substantially the same device as that employed in the Winona machine, and no suits instituted in case the demand were not complied with?

A. I recognize the fact that if your scarf-pin were tested, and found to be of pure gold, its value, from a commercial point of view, would be greater. If the Olin patent stands the test, (which I trust it will) it will certainly be of more commercial value, if Mr. Deering sees fit to make it such. It will be of more value to Mr. Deering and the corporation as a protection: competitors will be less likely to follow us in its use. I trust I am not digressing when I say, that Mr. Deering, to my certain knowledge has been in the lead in the development of the art. His predecessors held undisputed possession for ten years of the new class of harvesting machines. The perfection of that machine drove competitors almost out of the market. The reducing to practice and placing upon the market of the Marsh harvester wrought a revolution. Manufacturers of reapers were so affected that their business decreased, and as a matter of fact, the reaper is now seldom seen. Unquestionably then they were leaders in the revolution. I have kept pace with these matters, and am prepared to give the facts, if you wish them, that nearly every step in advance, that is, in putting new and im-

proved devices on the market have been made by Mr. Deering, and that such steps have been followed by both of these defendants, they coming out with similar devices, one, two and three years later. In view of the fact that Mr. Deering's patents, as well as nearly all grain-binder patents have been largly ignored, I think he would be warranted in putting a stop to the infringements of his rights. Whether any demand will be made or not, by him, I do not know. There has never a word passed between us.
173 This I deem clear, however, if the court in his wisdom shall see fit to sustain this patent, I trust it will be respected.

X Q. 137. Does what you have said in the last answer apply also to the Steward patents numbers 101,264, 266,913 and 272,598?

A. I see no reason why not. I do not wish my statements to be treated in any way as threats. I have no right to make them, as such, and as I have said, Mr. Deering is not litigious.

X Q. 138. You have mentioned interviews that were had with the representatives of the McCormick Harvesting Machine Co., prior to the intervention of that company in this suit. Was Mr. Deering any less litigious and aggressive at that time than now?

A. I do not know that he was.

X Q. 139. Did you not personally, as the representative of Mr. Deering, confer with Mr. McCormick concerning the menace to other manufacturers implied by this suit against the Winona Co.?

A. I am not averse to explaining all that took place in all of those conferences. I have memoranda regarding those matters, but as it would not be fair, without the consent of Mr. McCormick or Mr. Parkinson, to say anything regarding them, I trust you will not ask me to do so, not even ask me to say anything regarding implied menaces. I will state that I never used any language that could be construed into a menace.

Mr. Arnold, one of the attorneys of record for the McCormick Harvesting Machine Co., now present in the absence of Mr. Parkinson, consents to a full recital by the witness of the matters above referred to, and asks the witness whether he will treat his consent as sufficient.

Complainant's counsel, objects to the inquiries as to the conferences which the witness may have had with Mr. McCormick or anybody else with a view of evading litigation as such conferences can in no way assist the court in determining whether the patents sued on are valid or whether they are infringed; and he directs the *the* witness that he may decline to go into the matter of such a conference, if he considers that they would involve considerable time and explanation.

By Mr. DYRENFORTH: The questions asked would be proper cross-
174 examination even if the witness had not first broached the subject of the conferences with the McCormick Co., in answer to X Q. 135. It is particularly so in view of that answer. However I will ask you a pointed question to call forth what I wish particularly answered.

X Q. 140. Did you not personally confer with Mr. McCormick in

regard to his company's entering this suit? In doing so did you not act as the authorized agent of Wm. Deering? Did you not refuse in that conference to guarantee Mr. McCormick that his company would not be sued under these patents, in case Deering should prevail against the Winona harvester works? And did you not offer to settle with McCormick for a monied consideration, paid by him or his company to Wm. Deering, and did he not refuse to pay any monied consideration whatever?

A. A part of those conferences was a personal interview with Mr. McCormick alone, without the hearing of others. I had previously considered the matter with Mr. Arnold and met Mr. McCormick at his own office. During that conference, or one held at Mr. Dyrenforth's office, we considered the matter alone. What took place at that particular conference, or that particular part of the conference I will decline to answer, without Mr. McCormick's consent. As a personal matter, I am exceedingly averse to going into this, and I ask that it be not pursued any further.

X Q. 141. Will you answer the question to the extent of saying whether or not at those interviews you were acting as the authorized agent of Wm. Deering?

A. As a witness I decline to go into the matter of that conference any further unless compelled to. I do now refuse to go any further without the consent of Mr. C. H. McCormick.

X Q. 142. Who advised Mr. Deering to acquire the entire interest in the Olin patent, with a view to bringing suit upon it?

A. Nobody that I am aware of. He possessed one-half the title from its birth, the other half he purchased in 1881 or '82; about that time Parkinson & Parkinson were retained by Deering, and I personally discussed several of the patents which Mr. Deering owned with them. My impression is that this was one. At any rate, I was clearly of the opinion that it was to Mr. Deering's interest to purchase the remainder of the Olin patent, and I so stated, and the transfer was made. In view of my past testimony, I do not
175 see where you are warranted in assuming that Mr. Deering bought the patent, "with a view to bringing suit upon it."

X Q. 143. What I am trying to get at is, whether you are simply the man Friday, or faithful steward, in this matter, or whether you are the Mephistopheles that has dragged poor guileless Mr. Deering into a protracted speculative litigation on such old fossil patents as the Olin, for example?

A. I trust I am a faithful steward; shall certainly try to be in all matters placed in my care. Whether I am a Mephistopheles, or not, I am sure I cannot say; I must acknowledge that my early education was neglected in the matter of Greek and fiction, my time having been spent, as I have stated, almost exclusively in pursuit of knowledge in this art, and in practicing it, hence the estimate I place upon the Olin patent. Your question implies that your estimate differs from mine. The court must decide as to who is the better judge, he who studied Greek and fiction, or he who has sweat blood in pursuit of this art, his particular calling.

X Q. 144. You did not accompany Mr. Banning and me to Min-

nesota last June, at the time Mr. John F. Appleby testified in Minneapolis, and Mr. Kirch, in Winona, did you?

A. No.

X Q. 145. Has there been any other occasion of taking testimony in this suit, when you were not present, taking an active part, at least advisory?

A. I was not present in Kansas, when the last testimony was taken there. I think I have been present at all other times (except, of course, the Minnesota matter you refer to). I have tried to be present at all times, and have taken an active part, in so far as to get the testimony together, procure copies of all documents, and lay the matter fully and carefully, persistently, in fact, before Messrs. Banning. I do not think that they have had any other aid. This matter falls within my duties.

X Q. 146. The times of taking testimony in this case have from time to time been fixed and postponed to suit your convenience and enable you to attend, have they not?

A. Yes; once or twice, I believe.

X Q. 147. Did you evolve the theory upon which it is thought to make the Olin claims include the butt-adjusters in general use at the present time?

176 A. No. A particular theory regarding this matter never entered my mind. The theory which I have worked upon is confined to the Olin patent, that is to say, I have never considered any theories or principles outside of the said Olin patent, and as a matter of fact, I have never for one moment doubted the position taken by Mr. Bates in this matter, and never have doubted the ability of the Olin patent to stand this test.

X Q. 148. The Deering corporation is a very wealthy and prosperous one, is it not?

A. Yes.

X Q. 149. It is one of the most wealthy and prosperous in the United States, is it not?

A. I think so

X Q. 150. Mr. Deering personally is a man of great wealth, is he not?

A. Yes.

X Q 151. I believe you have likened the sheet-iron shield at *at* the upper end of the deck on the Winona machine to the board R in the Olin patent, have you not?

A. Yes.

X Q. 152. In the Olin patent, how is the board R, placed with relation to the swinging elevator Q?

A. It is parallel with the line of travel of the said belt, and is so placed, relative to the so-called backing of the elevator upon which the grain slides, that the two, the backing and the board R, shall form such limits as to confine the grain in position to be acted upon by the belt Q.

X Q. 153. As shown in the Olin patent, what is the precise situation of board R, with relation to the elevator Q? I am asking you for

a description of the specific construction, and not for a recital of the functions, as you understand them.

A. It is a board which does not adjust as the binder is swung, with its lower surface so low relative to the upper edge of the belt Q, as to confine the grain relative thereto.

X Q. 154. I ask you to define specifically the situation of the board R, with relation to the elevator Q, in the Olin patent, irrespective of any functions. Is it over the elevator Q, or at the side of the elevator Q, or what?

A. Beginning with line 24, first column, page 3, I read as follows: "The board R is located over the belt or elevator Q." I do not think that is enough to answer your question, because it is not very specific, but if I continue the quotation, "and is so arranged as to keep the butts of the grain down, so that the belt can elevate them," the matter is clear, because the statement of the function in
177 the last part of this quotation makes perfectly clear what the first means, namely, that it shall be over the belt Q, and yet not so far above but what the grain shall be held in contact with the belt Q.

X. Q. 155. In the Winona machine, is the sheet-iron shield over the butt-adjuster?

A. I find the top of the butt-adjuster to be higher than the sheet iron, hence the sheet iron cannot be over it, but I also find that the butt-adjuster is from three to four inches wider than on some other machines. If it were a foot wider it would operate exactly as now. It is so much wider than the space between the table and the sheet iron that the sheet iron is cut away to permit it to swing without said higher portion striking. I find it cut away so that the adjuster can swing eight inches more or less. As a matter of fact the sheet iron is in effect, over such part of the adjuster as operates on the grain and it holds the grain down in such position, relative to the adjuster, that the butts can be operated upon. If this sheet iron were cut off at its front end squarely, there would be a space of about eight inches. The sheet iron would still perform its office,—would still co-operate with the belt to produce the desired result. It is made of iron instead of wood, it is wider, but not as long. In these respects it differs from Olin's; its function is the same. In Olin's machine if the board R were removed the grain would, by the action of the wind, and in some conditions by its own puffiness, so rise as to escape contact with the belt Q. In the Winona machine this is equally true. The construction of the McCormick is precisely the same but they have added, however, a supplemental piece of sheet iron which swings with the adjuster and keeps the gap closed between the end of what I have considered the equivalent of Olin's board R, the two parts of sheet iron in effect being, as I view it, Olin's board R.

X Q. 156. In those machines of the same type as the Winona machine but which do not employ a swinging traveling apron butt-adjuster, is not the shield at the upper end of the deck equally necessary?

A. Necessary, but not equally so.

X Q. 157. Could it be dispensed with any more easily, in such a machine as I have described, than it could be in the Winona machine?

A. Yes. In all machines it co-operates with the elevating devices, in defendants' with both the elevating devices and with
177¼ the butt-adjuster, there are thus two operative combinations in which the butter-belt is involved.

Adjourned till Monday, January 9, 1888, at 10 o'clock a. m.

JANUARY 9, 1888—10 o'clock a. m.

Met pursuant to adjournment.

P. C. Dyrenforth, Esq., present for defendants and T. A. Banning, Esq., for complainant.

Redirect examination by Mr. BANNING:

R. D. Q. 158. You have been asked among other things about the Buckeye machine. State whether you ever made a machine similar in construction to the Buckeye, and if so what facts you learned that have a bearing on the construction of the Olin invention.

A. In 1881–'2–'3 I constructed a machine for myself as inventor, and also another one was constructed by my brother and myself, in which we used substantially the construction of Miller's machine; the operation seemed to be perfect in both long and short grain.

R. D. Q. 159. State whether you have ever built any other machine in which the butt-adjuster was driven from the delivery end. If so you may state the facts about it.

A. Yes, Mr. Rob't H. Dixon and myself, four or five years ago made one in which the butt-adjuster was driven from its delivery end by gears on the overhung packer shaft. This was patented to us, and its construction may be seen in said patent which is numbered 267119. I also constructed another one prior to that in which the packer shaft beneath the binder deck was extended forward and was geared to the adjuster. I have always found, in my experiments that it is better to drive such an adjuster belt from its delivery end, because in such method of driving the resistance offered by the butts of the grain tends to tighten the belt Q of Olin rather than to slacken it.

R. D. Q. 160. If a mechanic were directed to build a machine like that described and shown in the Olin patent, sued on, what figures of the drawings would he take in determining the speed that should be given to the movement of the butt-adjuster?

177½ A. Figure 4, because that is the only one in which the bevel gears are fully shown.

R. D. Q. 161. Mr. Ellithorp, who testified Saturday, in describing the construction of the Olin machine which he made, says that they used one of the "regular elevators" by removing some of the teeth. Please describe the construction of those "regular elevators," if you know.

A. I suppose he refers to that form of elevator which we always built up to 1880, which consisted of a band of rakes precisely like

the elevator shown in Defendants' Exhibit Gordon Patent Office Model, which consists of a slatted inclined plane, up through the slots of which were thrust the teeth of the rakes. The removal of the teeth would, of course, leave that part of the elevator but a plane over which the adjuster could swing.

R. D. Q. 162. In cross-examination, the Olin and the other patents sued on in this case have been referred to as old patents, which Mr. Deering purchased for the purpose of this and other litigation. Please state the facts about the origin, development and perfection of the inventions described and claimed in the various patents sued on.

A. I am thoroughly familiar with the origin of them all. They were, without a single exception, invented by men in Mr. Deering's employ, at the time the inventions were made. The devices were described to Mr. Deering, to me and others, for consideration. The inventors were instructed by Mr. Deering, or by Mr. Gammon, who was part of the time his partner, to embody their devices in the harvesting machines and binders then being built by said parties. They were so embodied, and without exception every one was applied to the machines, and put into practical use by the thousand for years. With but one exception, all of the claims sued on cover devices which were adopted by Gammon & Deering, and by Mr. Deering. Not one of the inventions originated outside of the Deering factory.

Cross-examination by Mr. DYRENFORTH resumed:

X Q. 163. In the Olin patent, how high is the board R above the belt Q?

A. It is shown in Fig. 1 as some distance above; nearly the width of the belt.

X Q. 164. You have taken occasion to reiterate repeatedly in the course of your examination, that Olin says in his specification, that his belt Q may be used with other forms of elevators. Does he say anywhere in his specifications that it may be used in a different situation with relation to the elevator, from that shown, described and claimed in his patent?

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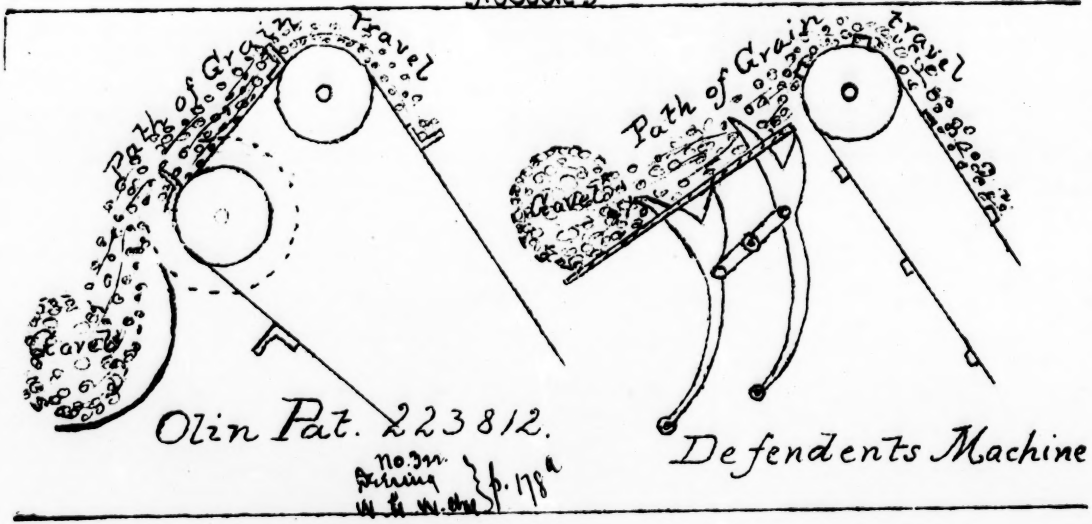
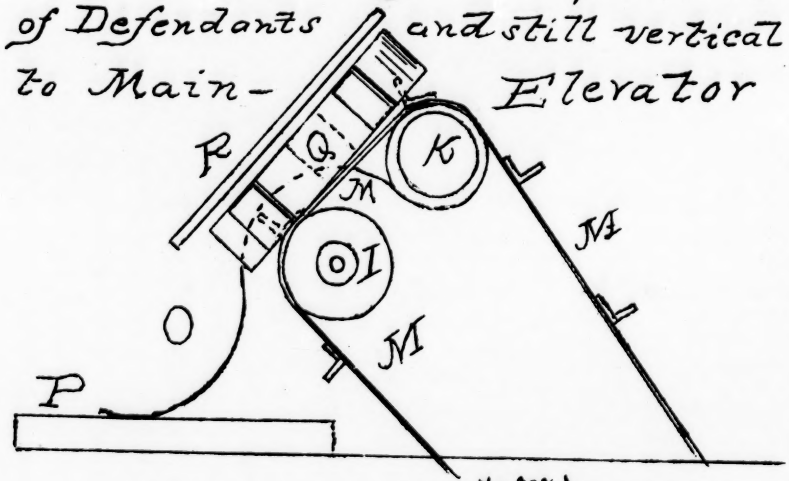
A. I don't think he does. I have, however, stated repeatedly that his specification showed that he did not limit himself to any particular form of elevator; I have further stated in substance that his invention is applicable to any of the forms of elevator known at that time, among which were defendants' form, and I have endeavored to show that, as embodied in defendants' machine, no departure has been made from Olin's principles; in fact, I trust I have amply shown that it conforms strictly to Olin's patent, because the changes in the position of the co-operating elements which form the subject-matter of his various claims, have not affected their operativeness, nor their mode of operation. I think I stated that if the packers were not for the moment considered conveying mechanism, there would still be a perfect co-operation of the adjuster-belt on a decline, with the elevating device on an incline. In most condi-

Sketch 5 113


Path of Grain travel
Gravel
Path of Grain travel
Gravel
Olin Pat. 223812.
No. 3 in Drawing W. to W. Ohio
p. 178a
Defendents Machine

Sketch 7

Olins belt Q, changed to position of Defendants and still vertical to Main-Elevator

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p. 178b

tions of grain, there might not be a contemporaneous action, but the operations would be consecutive, which would in no way affect the general result.

(Here follow diagrams marked pp. 178*a* & 178*b*.)

X Q. 165. A butt-adjuster of the form, and in the position shown in the defendants' machine, would be operative in a machine employing an elevator of the construction shown in the Olin patent, would it not?

A. Yes. I have so considered, and think I have referred to sketches five and seven, as showing substantially that construction.

X Q. 166. And Olin's butt-adjuster might be employed in the position shown and described in the Olin patent, with elevators of a different form from that shown in the Olin patent, might it not?

A. I do not call to mind any other form of elevator than that shown in the Olin patent, and in the Marsh patent, which is essentially the same, and the form shown in defendants' machine; none at that time to which it would be applied. It would be applicable to any form of conveyor that I have ever known, not that I make a distinction between elevator and conveyor, because such a distinction would not affect the result. It would be applicable to any elevator, however, that could bring the grain to it, and thus
179 present it in position to be operated upon while moving further under the influence of any conveying device.

X Q. 167. What is the construction of the Marsh elevator, to which you have referred?

A. Exactly that shown in Defendants' Exhibit Gordon Patent Office Model.

X Q. 168. Do you mean to say that in harvesting machinery the only forms of elevator known at the date of the Olin application, were the three that you have named?

A. By no means. There were many forms, but that form in which a rake elevated a whole gavel at a time, although an elevator, is not an elevator operating upon a continuous swath of flowing grain. It might be made, however, to operate in conjunction with an adjuster, so as to deliver the grain for central binding, but I think it has not.

X Q. 169. At the time of the Olin application were not elevators comprising alternately reciprocating toothed bars well known.

A. Yes. Defendants' Exhibit Jones Model shows such an elevator, with the exception that the bars do not alternate. Machines were put on the market by the Sandwich Mfg. Co., at Sandwich, Ill., constructed under the Low patents; to this machine the Olin device would have been applicable.

X Q. 170. That is to say, it would have been applicable in the same situation with relation to the elevator as is shown and described in the Olin patent, would it not?

A. Yes, to both situations, that of the patent and that of defendants' machine.

X Q. 171. Then is there anything in the Olin specification which implies that Olin contemplated the location of the butt-adjuster in the position of that in the defendants' machine?

A. Not in as many words, but machines were put on the market during the years '75–'6–'7, by Mr. Deering and his associates precisely like the McElroy machine, already offered in evidence, in which the arrangement of the so-called deck is precisely the same as defendants'. The public were well acquainted with this machine. Mr. Olin handled it as general agent. It will be observed, by referring to the Olin patent that the shape of the receptacle is somewhat different in the McElroy machine, not much, however. The Gordon model, also introduced in evidence, will show that the butt-adjuster would be as applicable to it as to defendants' form. The Gordon form, as we may call it, was thus well known in the art at the time of the Olin application.

180 & 181

X Q. 172. Was an Olin butt-adjuster ever used in connection with the elevator in those Gordon machines?

A. My recollection is that it was applied to both the Gordon (McElroy) and also what we call the Crane binder, this was one in which the grain was deposited on the receiving table and then by a lateral movement the gavel clasped by the needle and compressor were moved sidewise during the operation of binding. I did not follow any of these forms to the field and am not very clear regarding them.

X Q. 173. Was the butt-adjuster on the elevator side or the packer side?

A. As far as I know on the elevator side.

X Q. 174. Then the location of a butt-adjuster on the packer side of the machine was left for Appleby & Bullock to invent, was it not?

A. No, sir. I infer that your question calls for all the actual knowledge I have on the subject. For a time I thought I was the inventor of this device. Mr. Olin came to the factory and explained his ideas to me. I told him then and there what my claims were. Upon talking the matter over I became convinced that he was the prior inventor without any doubt, and so admitted to him. In that and conversations that followed, the adaptability of this butt-adjuster was fully considered; I may say exhaustively so. The different positions were discussed, and the conclusion arrived at that the butt-adjuster could be applied to any part of a machine, and was adaptable to any part of a machine, could be located upon any part, or in a position where it could operate upon the butts of the passing swath.

X Q. 175. Nevertheless the location of the adjuster on the packer side of the machine was left for Bullock & Appleby to patent, was it not?

A. I think so, and as that mere change of location, without material change of operation is all there is in the Bullock & Appleby patent, I am not clear that there is sufficiency of invention to sustain a patent. I have before this expressed some doubt.

X Q. 176. Is Wm. Deering or the Deering corporation a licensee under the Bullock & Appleby patent?

A. Yes, in this way; at the time Mr. Deering made his arrangement with Mr. Appleby, with Mr. Bishop, and with Parker
182 & Stone, the three parties owning the Appleby patents, they granted him the right to use the Appleby patents including future inventions that either one of the said parties might hold rights in. The Bullock & Appleby patent is not mentioned. I was present when the arrangements were made, but not when they were formulated, and I do not remember that the Bullock & Appleby invention was mentioned, yet, however, under the agreement, I think, he, Deering, is entitled to use it.

X Q. 177. You have responsible charge of this suit, have you not?

A. It comes within my department of the business. I wish you to consider me as I consider myself, two individuals in this matter, as one, having charge of Deering's patent matters, and quite another individual as a witness influenced only by facts, and, I trust, a correct knowledge of the art.

X Q. 178. I will try to do so Mr. Steward. There is a character in Gilbert & Sullivan's opera, of the Mikado, who held similar conflicting offices, and they got him into endless trouble. I refer to Pooh-Bah. When did Mr. Deering become a licensee under the Bullock & Appleby patent?

A. In the fall of 1878; during '79–'80; he made his arrangements with the owners of the Appleby patents. I have stated to you that none of those papers mention the Bullock & Appleby patent, but that they covered future inventions that might be patented to either or any of the parties. I consider that Mr. Deering has a shop right under that patent, whatever its value.

Redirect examination by Mr. BANNING:

R. D. Q. 179. You were asked Saturday about some conferences which took place between yourself and Cyrus H. McCormick, Jr., before they petitioned to be made parties to the Winona suit, and asked whether in these conferences you were acting as the authorized agent of Mr. Deering. I believe you did not say whether you were so acting, and I now ask you whether you were or not?

A. I intended to say that I was, and supposed until a few moments ago, that I had so answered. The series of questions that called for that answer, were questions in which in fact many questions were involved in one. That one question, how-
183 & 184 ever, was definite, and should have been answered by me, that I was acting as such agent. It was what occurred at the conference that I refused to state.

R. D. Q. 180. You may also state whether or not there was anything in those conferences that you have any desire to hold back or not disclose, if authority be given by Mr. McCormick, to disclose them.

A. No.

Counsel for complainant states, that the witness is ready and willing to state everything that occurred, or that was said in the conference between himself and Cyrus H. McCormick, Jr., if the assent of Mr. McCormick be obtained, and he requests defendants' counsel to obtain such assent, so as to release the witness from any obligations of honor which he may feel under, not to disclose what passed between himself and McCormick without his assent.

Counsel for McCormick says that he is not aware that witness has been asked on cross-examination to relate any confidential conversations which took place between him and McCormick, but on the contrary, his recollection is that witness was asked essentially the question just above answered by him in redirect, and declined at that time to answer it, on the pretext that to do so would involve a violation of confidence on his part, unless the seal was removed by Mr. McCormick. If counsel for complainant wishes to go into the question of conversations between witness and Mr. McCormick relating to this matter, he has Mr. McCormick's consent to do so, provided it is postponed until Mr. McCormick, and Mr. R. H. Parkinson, of his counsel, who is now too ill to make the trip from Cincinnati, can be present, and thereupon counsel for McCormick asks counsel for complainant whether he will agree to postpone this topic, and the recross-examination on behalf of McCormick, until some time during the present week, when Mr. R. H. Parkinson can be present.

Counsel for complainant in answer states, that Mr. R. H. Parkinson may recross-examine Mr. Steward at any time during the present week, and may, if he and Cyrus H. McCormick desire enter into the matter of the conferences with Steward at any time while complainant is taking his evidence in rebuttal.

185 Met, pursuant to adjournment, January 18, 1888, 10 o'clock. Present as before.

JOHN F. STEWARD, a witness produced, sworn and examined on the part of the complainant, in answer to questions proposed by Mr. BANNING, deposed and testified as follows:

Q. 1. You have already testified in reference to certain matters, and as an expert of some of the patents sued on in this cause, I believe?

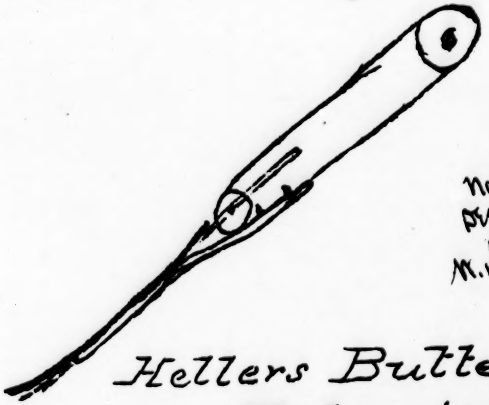
A. Yes, sir.

Q. 2. Considerable evidence has been taken in reference to the use of this exhibit marked "Defendants' Exhibit Heller Butt-adjuster, with Adjustable Extension," parts 1 and 2, here before us. If you ever made any investigations as to the use of this exhibit, or talked with any of the parties who have testified in reference to such use, you may state what investigations you made, and what conversations you had, with whom, and all about them.

A. On the day previous to the beginning of the testimony taken at Mr. Heller's house, I called on Mr. Reinhard Rubin in order to get what information I could regarding his knowledge in the matter in controversy. He stated to me that Heller bought a machine

Sketch 25. Copy. 119

Steward Sketch. Aug. 31, 1886



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p. 185a

Hellers Butter
Extension

from him in 1878, but said that "Heller had the extension on — machine, but he only saw it, and can't describe it." I asked him to particularly describe its construction, and he stated that he could not do it, that so long a time had elapsed. He seemed to be willing to give me any information that he was able, but as the matter that I have given in quotations above, was all, I entered in my memorandum book those words. Upon the same day I called on Geo. Heller, and he rode with me to his father's house, where some old Beloit harvesters and binders were, and explained to me quite fully what his father had done in the matter of improving the same. My purpose in calling upon him was to learn the facts in the case, and I paid particular attention to all that he said bearing upon the butter-extension, and in order that I might have something to show what his recollections then were, asked him to make a sketch or drawing of the device his father used. He stated that he could not make a drawing, although I urged him so to do, but he consented to my making one for him, which I did, strictly in accordance with his instructions.

(Here follows diagram marked p. 185*a*.)

186 I notice that he has stated in his testimony that "he" (Steward) "had the book in his hand, like this, and was marking;" "then he showed it to me and asked me if that was about it, and I said I didn't know." This sketch was made with the paper resting upon an old machine, and was as plainly in Geo. Heller's sight as could be. I made it from his description, strictly. I at first did not quite understand him, and sketched the iron bar as being upon top of the upper board of the butt-adjuster frame, and he told me that that was not right. I partly erased those lines, and drew the iron as lying beside the edge of the upper board of the adjuster frame. He stated that it was screwed fast there, but whether with bolts or screws he did not remember. I represented screws in the sketch, however. Geo. Heller states in his testimony that the sketch, when shown to him, was pretty nearly like the one I made, "and then I told him that was similar to the stiff one." He is not correct in this matter, because the answer from which I have quoted, implies that we had talked about some kind, other than a stiff one. I asked him particularly a number of times if his father had ever applied one to their machine that was not stiff, but that was hinged to the butt-adjuster in any way so that it would remain parallel with the sides of the table or deck of the binder. That his father had never applied such a one to his binder, he stated repeatedly. He seemed to be very frank, and as not attempting to hide anything. I went there for the purpose of learning all that he knew that would have any bearing upon the validity of the butt-board extension patent, and am very positive as to what I have testified to. I was present when Mr. Geo. Heller testified in regard to this matter, and noticed the fact that his testimony did not correspond with what he had told me, and the whole mat-

ter became so thoroughly impressed upon my mind, that I have not forgotten it.

Q. 3. You have read the testimony given by Mr. Renwick and considered the patents offered in evidence by the defendants in relation to letters patent to yourself No. 272,598 and are acquainted with the device offered in evidence by the defendants as "Defendants' Exhibit Heller Butt-adjuster with Adjustable Extension" parts 1 and 2, together with the testimony given by Gottlieb Heller and others in reference to the use of such exhibit. You have also in other parts of this record explained your mechanical knowledge and experience and your familiarity with the art to which
187 this patent relates. Please give your opinion as an expert in reference to the various matters introduced by the defence affecting the validity or construction of this patent 272,598, giving your reasons for any opinions that you may express.

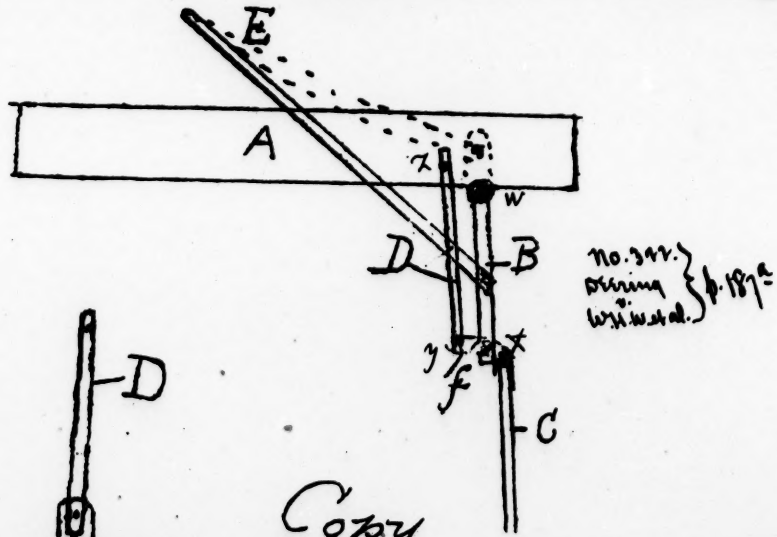
A. I was present when Gottlieb Heller gave his testimony in this case in September of 1886, and had some conversation with him regarding his mechanical achievements in the past; he stated to me that mechanics had been his particular study and from his conversation I gathered that he had prepared himself to enter upon the profession of mechanical engineer. I found him ready with his pencil, which would indicate the same; he told me that he was agent for the Milwaukee Harvesting Machine Co.'s Self-binders, and had been for years. He stated that the Milwaukee machine for which he was agent, contained the butter-extension and showed me cuts of the same in one of their circulars. He said that there were Deering machines near his place upon which he had seen the same device and that they were alike.

Regarding "Defendants' Exhibit Heller's Sketches" I will say that the device there represented is wholly inoperative, for the following reasons: As stated in the Steward patent, in order that the butt-extension may remain parallel with the sides of the binding table, regardless of the angular position into which the butter itself is swung, certain specific arrangements and proportions of the parts must be adhered to as I will explain with Heller's sketch before me.

(Here follows diagram marked p. 187*a*.)

In said sketch, B is said to be the butter-frame. It is pivoted at its upper end to the harvester frame. I have prepared a copy of Heller's sketch in order that I may mark and letter it so as to answer my purpose in explaining the device. The uppermost pivot of the frame I will mark *w*. He shows and states that his extension was hinged at *x* to the butter-frame and that its end *f* was pivotted to a bar (shown at *y*) which bar in turn was pivotted to the harvester frame at *z*. If the distance between *w* and *x* were the same as the distance from *y* to *z* on the bar B, and the distance from *z* to *w* on the harvester frame the same as the distance from *x* to *y*, on the part *f* then the said letters *w x y z*, would be at the angles of a parallelogram, and the bars B and D would remain parallel, and

Sketch 22

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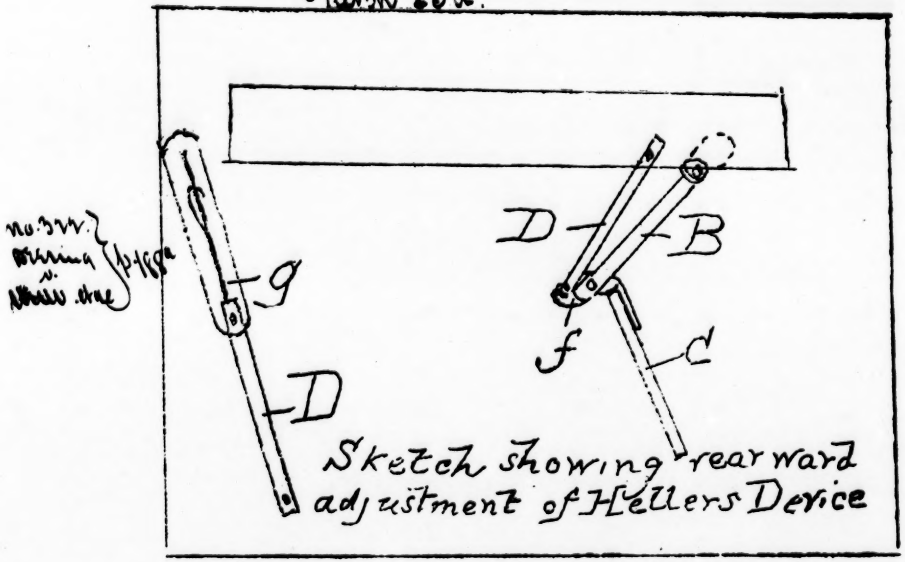
Copy

Defendants Exhibit 5
Hellers Sketches

Sketch 23a.




Sketch showing rear ward adjustment of Hellers Device

lines from $z$ to $w$ and $x$ and $y$ would remain parallel. The
188 parallelogram thus formed would operate like a parallel ruler, and whatever the position of his board A and the points $w$, $z$ located upon it, the part $f$, of his device, would always remain in a position parallel therewith, or the part $f$ would never change its position relative thereto, and the board C, if secured thereto, would always retain the same angle, relative to the board A, which is the only fixed part of the device, or to the binder table, which is indirectly secured to the said board A. I do not treat this sketch as having been unintentionally wrongly made, and the proportions wrongly shown, because, as I have stated, Mr. Heller is a thorough mechanic, and would have made this sketch strictly in accordance with any device which it represents, because the successful operation of the device, which defendants are charged with infringing, and which they seek to anticipate by Heller's extension, depends upon the location of the pivots. I do not think that Mr. Heller ever understood very clearly the principles involved, as he would have, had he constructed a device strictly in accordance with plaintiff's patent, for the following reasons:

Plaintiff's patent shows an effort to provide a butter-extension that shall preserve its parallelism with the sides of the table or deck. Heller's sketch shows a device that will not preserve such parallelism.

Plaintiff's patent shows a device for preserving parallelism, while Heller's sketch shows a device for destroying parallelism.

In order to show that the latter is true, I have prepared a sketch which I have numbered 23*a*.

(Here follows diagram marked p. 188*a*.)

While Heller's sketch shows the parts thrown forward, as they would be in operating in long grain, my sketch No. 23*a* shows the same parts when adjusted for short grain. It will be observed that the extension C will have attained an angular position, and thus instead of being placed so as to come in contact with the butts of the short grain,—that grain in which it is needed,—removed therefrom. Perhaps I should put it in this way, as it is true that the device is almost needless except in short grain; in the particular grain where needed, Heller's device, instead of retaining its position relative to the straws acted upon, moves away therefrom so as to become wholly inoperative.

Understanding, as I do, that the primary principle involved in the butter-extension patent is, that the said extension shall
189 always be present and in proper position relative to the butts of the grain, I cannot see how a device such as shown in Heller's sketch can anticipate it. The patent purports to cover something always present and in proper position for specified duties. The sketch shows a device that any effort to adjust places out of operative position. I have carefully considered Mr. Heller's testimony, and I do not think that the misplacement of the angles $w$, $x$, $y$ and $z$ of what should be a parallelogram, was due to inadvert*ance*

as I have already stated, but I do think, that if he ever constructed such a device, as I have before said, he did not understand the principles, because, in answer to cross-question, page 161 of printed record, he says, "I had another iron on the board to which this one was connected to slide; I couldn't get the end of the bar B exactly right, and made this iron to adjust it on; I would slide it on the iron to the right length and then make it tight with a bolt." And in answer to X Q. 66 "so that I could get the right length of the rod to reach down to the butter-extension and keep that where it ought to be," and X Q. 68 "the rod was not extensible, but by means of the slide I could make it longer or shorter" and in answer to the question "how was the rod D attached to the slide *g* bolted to it?" he answers "I put rivets in at the time I made it," and further on he states, that the slot was very long. Referring to my sketch 23*a* it will be observed that if the rod D were capable of being shortened or moved upward, the board C would be brought to a vertical position. If it were desirable to remove the parts to the position desirable for long grain, the board C would then be wrong, and it would be necessary to extend the rod D, in order to throw it forward where it ought to be, and whenever the parts were adjusted for various lengths of grain it would be necessary to extend or shorten the rod as each special case might require. And this I believe to be what Heller means when he says, "I could not get the length of the bar D exactly right and made this iron to adjust it on. I would slide it in the iron to the right length and then make it tight with a bolt." I do not consider that he means that he took this way of determining how long the rod D should be, because it would be thought by a mechanic to be almost axiomatic that the length of D should be the same as that B, and that the distance between *x y* should be the same as between *w z*.

190 If the principles in his machine depended upon the principles involved in a parallel ruler, there would be no necessity for varying the length of D. If it did not depend upon the principles involved in a parallel ruler, then it would be necessary to vary the length of D, and whether or not it would anticipate, I will consider hereafter in treating of the patent. I am aware that Heller and others state in their testimony that the board C kept straight with the side of the table, but at the time this testimony was taken Mr. Heller told me that he had sold the Milwaukee machine for two years, I think it was, since when they had been putting out the butt-board extension, and that there had been in his neighborhood a Deering machine with the same device, for some time. In other words, he admitted to me that the testimony he had given was with the knowledge of the devices constructed in accordance with the Steward patent. In his sketch he places the handle E as attached to the adjuster about its middle. This is like modern binders, and he afterward corrected himself and showed it by dotted lines attached to an upward extension of the frame B. This showed him to have the modern arrangement in mind, during his direct examination. That is the arrangement of the same parts on the machine which he was selling.

Regarding the operativeness of the device which Heller claims to have made; the object of the invention covered by the butter-extension patent, is to adapt the machine to operate particularly in short grain, and Mr. Heller states in his testimony that his device was operated but little, because "the grain was too short to be bound with a binder at all." I can conceive that possibly the grain might be so short that a self-binder could not operate in it if a butter-extension were not used, but in my many years' experience I have never found grain that could not be bound with a self-binder. On the contrary, grain that can be cut can be bound with perfect ease, and, if it is true, as Heller says in X Q. 80, "the grain was too short to bind, so I took the binder off the harvester, and put an elevator onto the harvester and elevated the grain into a wagon," he simply cut and elevated it then. In the next question, however, he says that the fault was not "in the extension, but that the grain was too short to bind." Both statements cannot be true, because, as
191 I have said, grain cannot be too short to bind, unless it is permitted to escape by shifting out of position while forming in the gavel. If his binder would not work in short grain, then his extension must not have worked, because the sole purpose of the extension is to hold the short grain in position. The crucial test of the operativeness of a butter-extension is the ability to control short grain. That it was inefficient in such grain Mr. Heller admits, because, as he testified, he first put on a stiff adjuster, then says he put on the one which is now Heller's Exhibit Butt-Adjuster with Adjustable Extension, and then put on a stiff one.

He states that he put on the stiff one because the deck of his new binder was straight. I have made a chalk line on the sheet iron of the exhibit to show where it would have been necessary for Heller to cut it off to make it fit his new binder deck. This would have required but a moment's time—certainly very much less than necessary to make a new one. The fact that Heller applied a stiff one to his machine is evidence to me that he never understood the principles involved in, nor the desirability of such an extension as he claims to have made and operated.

Adjourned till April 24, 1888, at 9 o'clock a. m.

TUESDAY, *April* 24, 1888—10 o'clock.

Witness resumes:

The object of the butt-adjuster as used on defendants' machines, and as used on the Beloit machine, with which I was perfectly familiar, is, and was to not only shift the swath of grain rearward to place it for central binding, but to advance the butts and place the straws parallel relative to the receptacle. The shorter the grain the more desirable and the more efficient the butt-adjuster becomes. It not only shifts the whole swath of grain, but it evens up the butts of the straws, thus producing a square butted gavel. After the gavel is completed, in fact, while the gavel is accumulating, and while passing out as a completed bundle, it moves in a right line. If a butter-extension is used, it is necessary that it shall be so placed that its plane will correspond

with the position of the butt of the forming gavel; in other words, its line or plane must be that of accumulation and movement of the butt of the gavel. In defendants' machines I observe
192 that the butter-devices are capable of movement to an angle of about 25 degrees, relative to the deck. If a butter-extension were applied in such position as to be correct for long grain, that is, straight with the butter-frame so that when swung forward both should be parallel with the edge of the deck, then when swung rearward, as in short grain, I find that the butter-extension, if stiff, would be so placed as to extend rearward about 8 inches further than the delivery end of the adjusting canvas. The grain thus received from the butter would be packed against such an obstruction, and its butts would be retarded. With the extension pivoted so as to remain parallel with the sides of the deck, no such obstruction would be produced. Mr. Heller says that the first extension which he put on was a piece of tin or sheet iron, nailed fast. He says that did not satisfy him, he then put on the exhibit shown. He exchanged his old binder for a new one that had a straight deck, and says, "I made a stiff one for the new binder." He says he put from four to six stiff ones on other machines, but does not state that he ever made another jointed one. Now, I think it proper to consider the relative operativeness of the stiff and the hinged extension. As I have shown the movement of the stiff one in the direction of forming an obstruction, is one thing, and the hinging of a device to form no obstruction, yet to perform an office, is quite another thing. The devices are diametrically opposite in their action. The first, the stiff one, I will show, does not anticipate the patent in controversy, and the last one being stiff, also does not.

If the three worked to the satisfaction of Mr. Heller, then, as far he desired to go, they were all satisfactory; if satisfactory, they must have worked sufficiently nearly alike. If they worked nearly alike, then the second one he made was not like the patent, because the patented device cannot work so; on the contrary, its operation is diametrically opposite that of the stiff extensions. Now, I am aware that Mr. Heller says that the hinged extension was the best one. I agree with him, because with it, by adjustment of the rod D, which was rivetted to his slotted plate *g*, he could set the extension C so that it would not form an obstruction to the movement of the straws, while being accumulated in the form of a gavel. The 8 inches
193 of obstructive movement would thus be avoided. If he preserved the parallelism of the board C by means of the adjustment of the rod D, then this device was not adapted to set itself automatically whenever adjustment of the butt-adjuster was produced; hence, Heller's second extension, that introduced as an exhibit, was not like that shown in the patent under consideration. I am aware that Mr. Heller and other witnesses say that the board C kept straight with the bundle, when the butt-adjuster was moved, and that those mere words hint at a construction different from that shown in Heller's sketches, but his sketches and his butt-extension exhibit, agree exactly, assuming that the missing parts in the extension exhibit, were as shown in the sketches. He says the sketches

correctly represent his device. If so, the witnesses are wrong as to the device keeping straight with the butt of the bundle, because, as I have shown in my sketch 23ª, parallelism is not preserved, but destroyed when the butter is moved.

In answer to Q. 8, Heller says: "I made an extension out of sheet iron and heavy hoop iron." I understand this to mean that he took two pieces of iron and made the device therefrom. He states that he cut the iron with a chisel. I am familiar with all departments of shop practice, and an inspection of Heller's sheet-iron extension shows me that the lower edge was cut with a chisel, as he states. I see that the narrow edge was cut with a pair of shears, hence that Heller did not cut it. The wider end is cut as with a chisel, hence if Heller cut this sheet iron from a larger piece, he must have done part of his work with a chisel and part with shears. To have cut the other edges with shears instead of chisel, would have taken but a moment of time, hence I judge that he had no shears. The upper curved edge was also cut with shears, and its edge corresponds very nearly with the edge of the flat bar to which it is riveted. If Heller made this bar he bent it hot, because it could not have been bent edgewise when cold without leaving pronounced hammer marks, like those shown at the twisted end thereof. Such twist and bend was made cold, as shown by the hammer marks. It has not been heated because some of the paint remains. To bend such a bar edgewise while hot, it is not necessary to pane it, as this shows to have been. The holes in the bar were punched
194 while the metal was cold—by punch and die. The sheet iron and bar are painted the same color. The striping on the sheet iron conforms to the edges that were cut by means of shears. I am led to think that Heller did not put the striping on, or he would have run a line parallel with all the edges. The extension has had two coats of paint, first a pink one then red. Where cut with a chisel, no paint is shown—the bent end of the bar has been cut with a chisel; it shows no paint. The other end was cut by shears; it shows paint. The large hole at bent end contains no traces of paint, the square hole at the other end does. My conclusion is that the device was made at some factory, the two parts there made and riveted together. It is factory work, hence Heller did not do it.

Mr. Heller says, in answer to Q. 8: "First I only nailed a piece of tin or sheet iron on." Now, the Heller exhibit shows that no nails have ever been driven into the wood, except those which are used to hold the tenons of the frame into the mortises, and others to hold the boarding on. I am satisfied that no such nails were ever driven. If Heller drove nails in his, then this exhibit was not his.

Regarding the patent, 272,598, sued on, I will state briefly that the main object of the invention is to provide devices whereby the binder shall be able to automatically regulate the position of the band on the gavel—that is, "shall automatically place the band on the gavel in its proper position relative to the length of the grain, without any aid or attention from the operator." This idea was

conceived in 1877 or '78, and much time passed before I was able to finally select from the many mechanisms which were presented to my mind, the one which I have shown and described in this patent. The delay was caused by the difficulty of the task—that of giving a self-binder brain enough, if I may be permitted to so express myself, as to adjust itself relative to the length of the incoming straws, without any attention whatever from the attendant.

The patent says "under the principle involved many methods may be resorted to to attain the result. I have selected and developed what appears to me to be the most feasible plan. Several subordinate ends are reached by the different elements of the device which will be pointed out." The claims which defendant Winona Harvesting Machine Co., is charged with infringing, call for
195 a combination of certain of the elements, which combined, accomplished one of the subordinate ends reached, and I will not dwell upon the patent further than to make clear the matter in controversy. Beginning with line 51, is a description of the ordinary grain-adjusting mechanism. Beginning with line 67 "$d^1$ is a thin board or plate of metal as wide as the adjusting canvas, and pivoted to the frame of the latter at its lower extremity. From this board reaches upward and inward (see Fig. 3) an arm $d^2$." "Near the end of the arm $d^2$ is pivoted the bar $d^4$ connecting the arm $d^2$ with the overreaching arm $d^3$ near its top. In this arrangement we have four pivots, numbered 1, 2, 3 and 4. The distance between 1 and 2 is equal, or nearly so, to that between 3 and 4, and the distance between 1 and 4 to that between 2 and 3. In effect then, the parts D, $d^2$, $d^3$ and $d^4$ describe a quadrilateral having substantially equal and parallel sides, so that to whatever point the frame D is swung in its adjusfment the arm $d^2$ will remain parallel with the fixed arm $d^3$ and the board $d^1$ will always remain parallel with the edge of the decking, close to and over which the whole vibrates." "The board $d^1$ is of such length as to reach as low as the accumulating gavel and prevent the grain forming it while accumulating, from working or jarring forward." The patent further says, "that certain parts of my invention are capable of use singly as well as conjointly and I will first point out such independent action." "First, if the pivot bolt connecting $d^2$ and $d^5$ and the locking device be removed and a pin is inserted into the holes in the top rail and through the holes $d^7$ in the connection $d^5$ I have an adjustable butting mechanism supplemented by the board $d^1$ for preventing the gavel from working forward by the jarring of the machine, which shucking out of position is often very great in grain that is heavy at the butts." This description is of the operation of certain of the parts combined, when producing the result last referred to, and the claims which the Winona harvester works are charged with infringing are the 20th and 21st; the former of which reads: "The combination, in a grain-binder, of moving butt-adjusting mechanism and the board $d^1$ substantially as described." This is a combination of two elements. The "moving butt-adjusting mechanism" of the patent is shown to be exactly the same as that found

on defendants' machine. The board $d^1$ of the claim of the
196 patent, is one so placed as to have its plane always parallel with the sides of the binder table, regardless of its fore-and-aft position, and regardless of the position to which the butt-adjuster may be swung. It is further, a board which shall retain a certain relative position to the delivery end of the butt-adjuster so as to receive the grain therefrom and to prevent it from jarring forward of the position to which it has been carried by the said butt-adjuster. Both of these elements are found on the Winona machine, and were I to describe them I could find no words better fitting them than the words I have quoted from the patent. I can resort to no argument to show that the devices are similar, because of the fact that they are absolutely identical. The 21st claim covers the same combination of elements, supplemented by certain other elements which operate to preserve the parallelism of the butter-extension $d^1$ with the sides of the table, and yet permit it to be carried by the frame of the adjuster to which it is pivotted. The said supplemental elements consist of certain pieces which constitute a parallelogram in effect. What may be termed as the angles of the parallelogram are joints like those of a parallel ruler. If, as a familiar illustration the parallel ruler in common use, as shown in Webster's dictionary, be taken, and one wide portion be taken as the top rail of a harvester and the brass portions extend downward and the butter-extension attached to the other board and extend downward, immediately opposite the pivot, then we should have a device which would embody the principles involved in this claim as far as it is now necessary for us to consider. Turning to the Winona machine the frame of the harvester at the top is one of the wide bars of the parallel ruler. The round iron rod attached to the lower end of the butt-adjuster is equivalent to the other wide bar of the parallel ruler. The adjuster frame and the lever by means of which the adjuster is moved, constitute the brass connecting pieces of the parallel ruler. If I am right, this does not differ from the patent sued on, because all of the elements perform exactly the same office as they do in the patent. It cannot be considered that rod which is attached to the lower end of the adjuster is anything more than a part of the parallelogram which I have mentioned, although it seems to slide through guides, because I have taken the
197–209 said guides off and find that the device is as operative as before. A slot is found in the lower end of the lever, but this need lead to no confusion because it is unnecessary; a round hole would perform the same function. This is evident, because as I move the adjuster to and fro, the end of the rod hooked into it never leaves the lower end of the slot.

As the said slot performs no office, and as the said guides perform no office whatever, the part cannot either simply or jointly be considered to be devices, or elements, or changes in construction, whereby the said 21st claim is evaded—I mean by this, that in order to evade the 21st claim, parts must be substituted which perform the office differently, and the general result attained must be a different one. If the slot in the lever is useless and the guides useless, neither cuts

any figure, because the device with or without them is operative in exactly the same manner as provided for in the 21st claim.

210 Cross-examination by Mr. DYRENFORTH:

X Q. 8. Do you find anything, anywhere in the course of Mr. Heller's deposition in this case to the effect that he had qualified himself in the past to be a mechanical engineer?

A. No.

Counsel for defendants gives notice, that since the testimony of this witness in this behalf is not in rebuttal, but is in the nature wholly, of new matter, he will claim the right to take additional testimony in behalf of the defendants relating not only to this fact, but also to all the inferences which have been drawn from it by the present witness.

X Q. 9. What drawings did Mr. Heller make in your presence?

A. Heller's Exhibit Heller's Sketches.

X Q. 10. These sketches are of a very rough and crude nature, are they not?

A. In one sense, perhaps, in another not. The principal sketch was made very quickly with some commonplace article for a ruler and I noticed the remarkable correctness, as far as the parallelism of the lines were concerned and the angles. Of course it is an easy matter to make such a sketch much nearer correct, but unless a person is in practice they would not be likely to do as well in the short space of time which this required. It either shows familiarity with drawing, mechanical drawing, or natural ability.

211 X Q. 11. This sketch was made hastily in the course of the taking of Mr. Heller's deposition for the purposes of illustration, was it not?

A. Hardly that. It was to show something which he claimed to have done, or to represent, rather, something which he had made some time before.

X Q. 12. Do you find any statement of Mr. Heller's to the effect that the sketch is drawn in exact proportions or to the effect that if it were embodied in a device exactly as represented, the device so made would be accurately adjusted in every particular?

A. As to the first part of your question, no. As to the second part of your question, I think not, but taking your question as a whole, I will say, whether the butter-extension board preserves its parallelism, or substantially that, relative to the sides of the binding table is an important matter in this case. Assuming, for the moment that butter-extensions—mere elongations, had been made before, then the validity of the Steward patent depends upon whether butter-extension had been made before, which, by some means, automatically preserved their parallelism. If it shall be decided that Heller made some kind of an extension, the Seward patent may yet be valid. If he did actually make an extension like Steward's then the patent may be adjudged to be invalid. It is something of an important matter, then, to know exactly what that Heller device was. Now, Heller says, "Of course I made—so it

would adjust and keep straight with the butts of the bundle." Evidently he meant something by straight with the butts. He is then asked, Q. 9, "Please describe how you attached it so that it would always keep straight with the butts of the bundles." He replies, "That I could easier show than describe." He made his sketch; that sketch is all that is found other than mere words in the whole Heller matter, which shows what he accomplished. The parts D and *g* are wanting on the sheet-iron exhibit, which he introduced. He made this sketch to show how he attached it so that it would always keep straight, and he made the sketch in which is *g* in order to show how he could adjust it. I find no statement that if it were embodied (referring to the last part of the question) that it would be accurately adjusted in every particular; on the contrary providing the slot, as he did, shows, if anything, that it would not accurately adjust. He says that his slot in *g* was nearly the
212 whole length of the piece and that the piece was from 4 to 7 inches long, and that it was solid for an inch, or an inch and a quarter at the end. This might leave a slot of—say something from 3 to nearly 6 inches. On the Winona machine before me, I find that if an adjustable rod were used like that D *g* in Heller's sketch of but about 2½ inches would be sufficient to make the butter-extension parallel with the sides of the table wherever it might be placed.

I may perhaps say that Steward strove to produce an extension that would require no adjustment. Now, Heller has shown a device for producing adjustment.

X Q. 13. Is it customary in making crude illustrative sketches to aid an explanation, to observe strict accuracy, in matters of proportion and measurement?

A. That depends upon circumstances; a patent is property vested in some one. Whether the assignee shall enjoy property rights in this patent or not depends upon whether it is valid or not. If it is invalid because of something which Heller did, then the exact thing which Heller did should be shown. If you were charged with a capital offence, which is hardly supposable, the testimony should be of an exact nature. Whether guilty or not would depend upon whether you did or did not do the particular thing charged. Whether or not parallelism is preserved in the Steward device depends upon correct proportions. If Heller's device depended upon the same principles such exactness was necessary and he should have stated something like this: I have not shown it in proper proportion, and as shown it will not keep straight. There is nothing to show that his proportions are not correct and I have assumed that they are substantially correct and that they will produce misadjustment like that shown in my sketch 23*a*. I am borne out in this by the fact that he produced a slotted connection whereby he might cover any errors in construction of the device which would produce misadjustment. If a mere matter of principle is to be illustrated it is not customary to observe strict accuracy and if Heller had said that the principles upon which my device operated, were those of the parallel ruler or that the preservation of parallelism of

the butter-extension depended upon the principles embodied for instance in a rhomboid jointed at the angles then we should have understood that no adjustment was required. In short, a sketch
213 and words must convey a correct idea, if words descriptive are not used, then it is customary to be accurate in making sketches.

X Q. 14. Does not Mr. Heller say that in his actual device when the butt-adjuster was moved in and out the extension kept straight with the butts of the grain?

A. Yes, among others he says, that it would be "just straight with the butts of the bundle;" if by straight he means parallel, it would, of course be parallel with the butt of the bundle, because the butt of the bundle would form against it, still it might be very far from parallel with the edge of the deck. In another answer, 38, he says, "it kept straight with the butt of the bundle." I reply, of course it did, because the butt of the bundle formed against it. He says in another answer "but the angle of that extension did not change," and I am reminded of the fact that he said this after the company which he represented as agent had been putting a butter-extension similar to that of the Steward patent on their machines for some time, and after this adjuster had been lost for several years, and notwithstanding he had made a sketch, which is the only thing extant to show that which he did in 1878, that shows it could not possibly have kept straight and which shows a slot for adjustment. This is all which I have succeeded in finding in Mr. Heller's testimony regarding that matter.

X Q. 15. Do you not find on pages 152 and 153 of defendants' record that Mr. Heller says he can make a rough pencil sketch representing the adjustable extension and the butt-adjuster and that upon request he proceeded to make the pencil sketch "Defendants' Exhibit Heller's Sketch" and that in answer to Q. 12 in which he was requested to describe the construction and operation of the device represented, he says, among other things, "*f* is an angle or link of iron and D is a rod to keep the butter-extension straight, if the adjuster got moved"?

A. Yes, but he says in answer to X Q. 64 "I had another iron on the board to which this one was connected to slide. I couldn't get the length of the bar D exactly right, and made this iron to adjust it on; I would slide it in the iron to the right length and then make it tight with a bolt."

Yes, he does say in answer to Q. 12, that D is a rod to keep the butter-extension straight, and yet he shows, in answer to X Q. 64,
214 that he had another iron, by means of which, connected with the bar D, he would slide it to the right length, and make it tight by a bolt. These answers do not agree.

X Q. 16. Do you not find that in Q. 40, page 157, Mr. Heller was pointedly asked to explain what he meant by his expression, "the extension always remained straight with the butts of the grain, when the butt-adjuster was moved," and that he replied, "so as to make the butts even in the bundle, the angle of the butt-adjuster

changed as it was moved, but the angle of that extension did not change"?

A. I find what you say, but the last two lines of the answer in the printed record are not the words of Heller; I was present when the question was asked, and remember distinctly that Mr. Heller, because of his bad English, was helped by the attorneys for defendants. I was present with plaintiff's counsel, and took particular notice of this matter. It will be observed that there are two sentences in the answer. The words "so as to make the butts even in the bundle," would have nothing to do with the angle of the board because they would be even if they formed against the board. But the last part of the answer is a correctly formed sentence, and in very good English.

X Q. 17. You were present, and were accompanied by counsel, were you not?

A. That is not right. Mr. Deering's counsel was present in his interest, and I was present, because I have charge of plaintiff's patent matters. I considered it very improper that words should be put in the mouth of a witness, and so said at the time, although I had no right to object.

X Q. 18. If what you say is true, and the answer in question does not accurately represent what Mr. Heller said, whether in his own precise language or not, why was no protest or objection entered at the time?

A. I cannot say; Mr. Banning will bear me out, that I thought it improper, and so stated. It was his business to object; if he had acted in accordance with my wishes, he would have done so.

X Q. 19. Do you mean to say, that either you or Mr. Banning would, without protest or objection have allowed anything to go down on that record which the witness did not say, either in the precise words used, or in substance?

A. Such was allowed; and I will state further, that in nearly
215 all of the answers made by those German witnesses, where technical terms are used, they were aided, and you will certainly remember of the heated controversy between myself and Stanley S. Stout, who was present, in regard to this matter. You will remember that I charged him, at the time, with putting an important word in the witnesses' mouth, and that too, while he, although claiming to be counsel in the case, was permitted by consent of counsel to write down the testimony of the witnesses.

X Q. 20. Since you put it so directly, you compel me to say that while I recollect that you exhibited, during the whole time of the taking of that testimony, a remarkable degree of animosity toward Mr. Stout personally, I do not remember the particular word to which you refer, and I distinctly remember that Mr. Stout did nothing whatever that was in the least degree improper, though, for some reason, you seemed to be very fearful that he might do so. Does it not occur to you, Mr. Steward, that you are playing the baby act?

A. No. I kicked then; now you have asked me particularly about that answer; you call for the whole truth, how could I avoid

explaining? I reaffirm what I said about it; I know nothing about the animosity with which you charge me. I do not feel bad over it, because you are not under oath. I will admit, however, that I did not feel right toward Mr. Stout, because of the part he was taking, and it would have seemed to me unwarranted, were it not for the fact that the Milwaukee Harvesting Machine Co., which he has long represented, were infringing the same patent. Had he been a disinterested party, I should not have objected to his aiding in putting the thoughts of the German witnesses into English words. I will do my present questioner the justice to say that I saw nothing that led me to think that he personally intended to be, or was, anything but fair.

Counsel for defendants objects to all testimony by this witness tending to impeach the record, as it is apparent, from the record itself, as well as from witnesses' own statement, that complainant was represented by counsel who failed to enter objection at the proper time, if any occasion for a valid objection existed.

X Q. 21. Will you please state exactly how you understand the slotted attachment *g*, from Mr. Heller's description, to have been constructed and to have operated?

216 A. Constructed as shown on the reverse side of Defendants' Exhibit Heller's Sketch, and adjustably secured to his board A, whereby the extension C could be always kept straight with the butt of the bundle, or side of the table, if you please. If parallelism of board and side of table could be preserved at all, it could be so by adjustment of the part *g* forming part of D.

X Q. 22. To what, if anything, do you understand that the part *g* was secured?

A. To the board A and to the rod D.

X Q. 23. In what manner do you understand the parts *g* to have been secured to the board A?

A. To X Q. 71 he says he used rivets, (plural). He is then shown sketch, and is asked if D was riveted to the plate *g*. He replies that it "was fastened to the plate *g* with a bolt." Whether to take him as actually meaning rivet or bolt I do not know, because, in speaking of the slot-ing, he says, in answer to X Q. 73: "It was nearly the whole length, except that the ends where the bolt or rivet went in—whatever you call it." In the next line he refers to it as bolt or rivet. Then I can simply understand, by means of bolt or rivet.

X Q. 24. Do you understand the slotted plate *g* to have been rigidly or pivotally connected to the board A?

A. Rigid; and my reason is this: if pivotally, he would have said so. He does say that the rod D, "was fastened to the extension at the lower end loosely, with a rivet." I suppose this means that D and *f* were pivotally connected, but he does not say that *g* was secured to D pivotally by means of a bolt. He is speaking about how D was secured at each end to something else, and says that, at the lower end "loosely with a rivet, but was fastened to the plate *g* with a bolt." If it had been loosely pivoted at both ends, he should have said so; that he did not say so is corroborative of the con-

struction that I have put upon the device, because, if his butter-extension was placed in position relative to side of binder table by means of the slotted rod D *g*, then no pivot would be required.

X Q. 25. In answer to X Q. 64, Mr. Heller says, that he had another iron on the board to which the rod or bar D was connected to slide, that he could not get the length of the bar D exactly right, and made this extra iron to adjust it on, and that he would slide it in that iron to the right length, and then make it tight with a bolt; what would he make tight with a bolt, and how, according to your interpretation of this answer?

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A. He would slide the other iron, which he immediately after explains was that *g*, which he subsequently sketched. It is the glate *g* and rod D as one piece, in effect that he would make tight with a bolt. I observe that he says I would slide, he does not say I did slide. I understand this to mean that on different occasions he "would slide it in the iron to the right length and make it tight with a bolt." If the principle involved in his device was other than that involved in the construction I have given it—if it was that of a paralellogram form of connection with a harvester frame, then once right, always right. But my construction is that he would need to slide the rear D every time that he wished to make an adjustment. If I say, regarding my boy, that he would go to school a year ago, etc., you would understand me as meaning that that act was performed several times. When Heller says, "I would slide it in the iron to the right length," that leads me to infer that he means to say that he moved it more than once—frequently adjusted it; that he adjusted it for a purpose. No adjustment is required in the Steward device, because it is self-adjusting; hence I infer that the Heller device could not have been like the Steward device.

X Q. 26. Does he not say that his board A split once or twice, and that he had to reset the device?

A. Yes; but you will observe that he does not say that the handle E produced any strain upon the board—in fact, no splitting strain would be put upon the board if the lever was in the position shown in dotted lines, which he states was the correct position. The splitting strain, as it must have been, as he practically states that it was due to his extension attachment, and this bears out my construction of his device. In work in the field, very little stress is applied to the butter-extension. The straws but jar forward against it. To hold the straws in place brings so little stress upon it, that in all machines manufactured by Deering, the extension has been hinged to the butter at the top only, by a single light malleable casting. I have many times noticed, however, that the butter-extension cannot be moved against an accumulating gavel, without great force, because that is against the action of the packers. Now, if Heller's extension was wrongly adjusted at any time by means of his adjustable slotted piece, or if, when in proper position for very short grain, the adjusting canvas was moved for slightly longer grain, then the full action of the packers would compact the butts of the grain against the said board, and

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exert so great a force as to split the board A, unless the same was very strong. If his board C was always parallel with the path of movement of the grain in going into and out of the receptacle, then I say, that the pressure upon the said board C was insufficient to break or split A unless it was a mere nothing.

X Q. 27. Then would not the breaking and reattaching referrred to, explain the use of his expression "I would slide it in the iron to the right length and then make it tight with the bolt"?

A. No, because no slot would be necessary. He would simply put the bolt back in the same hole. If the bolt pulled the edge of the board off, then the fact that he restored the edge of the board by nails, as he states, would reproduce the hole in the same position that it was before.

X Q. 28. Do you think likely that he would put it back in the same place where it had split before?

A. If his device was like Steward's device he must necessarily have done so, because any change in the position of one of the pivotal holes would defeat the object of the whole arrangement and cause it to destroy parallelism of extension to the edge of the table, rather than preserve it. If my construction of Heller's device is right, then he did not need to replace the bolt in the same definite position, but might secure the slotted piece anywhere on the board A.

X Q. 29. Suppose he secured the piece *g* higher on the board and slid the rod lower in the slot, what would the effect be?

A. The rod is not adapted to slide in the plate *g*; it is rivetted there, as I understand Mr. Heller's testimony.

Adjourned till April 26th, 1888, at 9 o'clock.

APRIL 26, 1888—10 o'clock.

Met pursuant to adjournment.
Present as before.

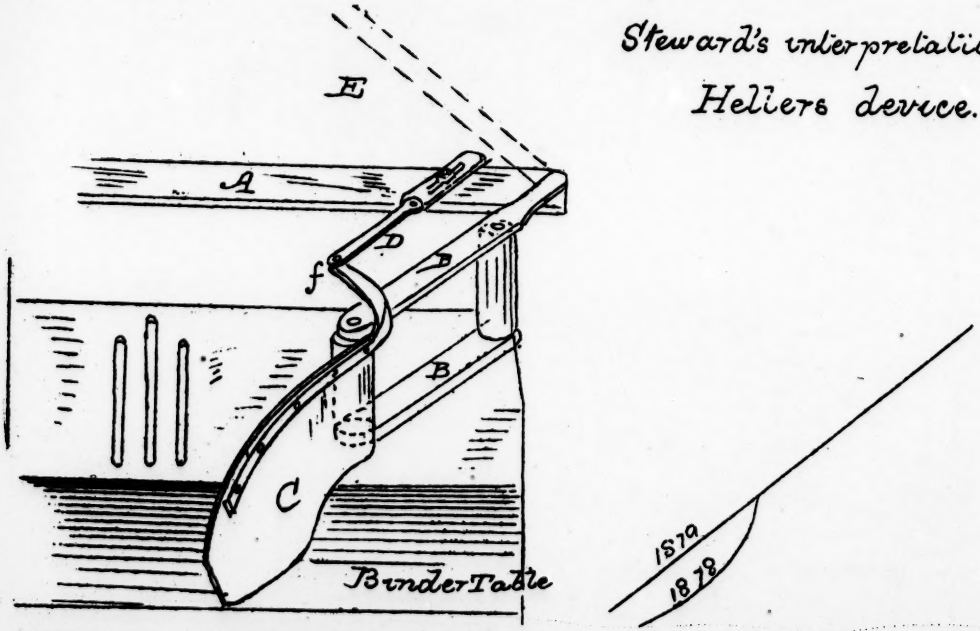
X Q. 30. What I am trying to do, Mr. Steward, is to find out from you how you understand Mr. Heller's testimony, concerning this attachment *g*. I wish you would make it as clear as possible in any manner that you like, just what you understand that construction to be.

219–229 A. I produce an off-hand perspective sketch of No. 24, Heller's device, lettering the parts as Heller lettered them in his sketch.

(Here follows diagram marked p. 230.)

I understand that the rod D *g* of this sketch was composed of a flat strip of iron similar to that upon the top of his sheet-iron extension exhibit rivetted or bolted to a wider strip having a slot from 3 to 6 inches in length. Where D *g* are connected I consider them not jointed, because while particular to state that D and *f* were loosely jointed, D and *g* were simply bolted or rivetted. I do not think that the bolt or rivet passed through the slot, because

Steward's interpretation of Hellers device.




No. 322.
Deering
v.
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p. 230

he says the piece was solid for an inch to inch and quarter at the lower end, and I think that the bolt or rivet passed through a hole therein provided. If D and *g* were connected by bolt the latter might have passed through the slot, but if a rivet were used instead of a bolt, it could not have passed through the slot, because a rivet cannot be headed down—very well, to say the least, in a slot. The plate *g* was adapted to lie upon the board A and be there held by a bolt, as I understand it. In my sketch I have not shown the sheet iron C as parallel with the sides of the deck because it would not be sufficiently in perspective to show its form. On the other hand I have purposely shown it is not parallel because that shown is the position which Heller's adjuster would be placed so that the action of the grain upon it would exert stress to split the board A as I explained in answer to X Q. 26. By adjustment of the plate *g* on the bolt which passes through its slot, the extension C could be swung to a position parallel with the sides of the table at will.

X Q. 31. Are you assuming that the connection between the rod D and the slide *g* was a rigid connection?

A. Not necessarily so. The strains brought upon D and *g* were tensile of course and a stout cord or strap would have answered as a substitute for the said parts, but they could not have been adjusted as easily as by the slotting method.

X Q. 32. Perhaps I do not make myself clear. Do you understand the connection between the rod D and the slide *g* to have been rigid or pivotal?

A. I have found nothing in the record which will throw any light upon that subject. If my understanding of Mr. Heller's sketches and testimony is correct, then it would make no difference whether rigid or pivoted. I may say, however, that while he says D *f* 231 were loosely jointed that D *g* were "fastened to the plate *g* with a bolt." This explanation of the fastening of the two ends is in the same breath, as it were, and will be found in the paragraph in parenthesis following answer to X Q. 71. I wish this to qualify the first part of my answer.

X Q. 33. Do you not find on page 153, that Mr. Heller says, that the extension was fastened to the butt-adjuster by a bolt so that it could be moved, and that the rod D was fastened to the angle *f* and to the top board A by bolts so that it could move—I refer to questions and answers, 15 and 16—and does he not afterwards, qualify this by explaining that the rod D, was not fastened directly to the board A but to a slotted plate *g* which in turn was secured to the board A?

A. As to the first part of your question, Yes, but I do not understand "fastened by a bolt so that it could move," to mean necessarily jointing. The parts could move endwise, because of the slot. As to the last part of your question, Yes; and I find, on page 161, regarding the plate *g*, that he "made this iron to adjust it on." Then in answer to X Q. 66 he states the purpose, "so that I could get the right length of the rod to reach down to the butter-extension and keep that in the place it ought to be." That is, he "made this iron to adjust it * * * so that I could * * * keep

that in place where it ought to be," that is, the extension (quoted from answers to X Q. 64–5). X Q. 67 explains the matter, wherein he says, in substance, I made an iron with a slide that was connected with a rod which reached down to the butter-extension, "and then of course I slide that so as to get the right length and fasten with a bolt on the board." I understand what I have quoted to have been intended to be in the past tense; that "slide" was intended for slid, and that "fasten" was intended for fastened, because, in the same answer he says, "I made" and "was connected" and that the rod "reached." If I am right in this matter then he intended to say, "I slid that so as to get the right length and fastened with a bolt on the board." I am satisfied that although, what your question calls for is true, I do not think that by "moved" he meant on an axis but that he did mean slide.

X Q. 34. When giving answers 15 and 16 on page 153, Mr. Heller was referring to the Exhibit Heller's Sketch, was he not?

A. I think not; he was asked how the extension was,
232 whether rigid or pivoted, and how the rod D was fastened. He was not asked how does your sketch show it? The reference to the sketch was in answer 12.

X Q. 35. Does the Exhibit Heller Sketch show any connection between the rod D and board A by which the rod could slide?

A. No, but his supplemental sketch upon the reverse side of the sheet does show, coupled with his explanation.

X Q. 36. But that sketch on the reverse side was not made until after the witness had given the answer to X Q. 64, was it?

A. That is true and it was made to correct his previous sketch, hence, I have incorporated it with said previous sketch in making my sketch 24ª.

X Q. 37. Was not the Exhibit Heller Sketch made with a view to representing the principle of the device and its general mode of operation without reference to such matters of mere detail as the slide?

A. No. In question 9 he was asked how he attached it so that it would always keep straight with the butts of the bundle. The question does not say, by the way, how it was kept straight with the sides of the table so as to form the butts of the bundle square with the line of movement of the grain. He made this sketch and was then asked to describe the construction and operation of the device represented by the sketch. He was not asked about the principle involved. In his sketch he showed a rod D for holding the extension from moving out of place, as I construe it, and in cross-examination he explains that he made the rod adjustable by means of the plate *g*. In X Q. 64 he is asked, if he represented the rod D, as connected with the board A rightly, and he explained that it was not right, but had another iron, which he then drew.

X Q. 38. Does he not say in answer to Q. 50, on page 158, that the principle in your butt-adjuster and his seemed to him to be the same? And did he not say this after examining Fig. 3 of your patent 272,598?

A. No, he is asked about the extension shown in the patent,

which is, of course the mere board $d^1$ and he replies "what I see there seems to be the same principle as mine." There is nothing to show that he took into account the principle involved in the Steward device, on the contrary, his testimony convinces me that he did not understand the principle involved in the Steward
233 device, or he never would have provided a slot. He states plainly that his slot was necessary. Now in the Steward device no slot is necessary, and the necessity of a slot in his case is a tell-tale and is positive proof to me of the difference in principle between the two devices. A parallel ruler needs no slot at the pivots.

X Q. 39. In the drawing of your patent, 272,598, does $d^3$ represent a fixed or a movable piece?

A. It is fixed.

X Q. 40. Then is there any difference, in principle, between pivoting the upper end of your strip $d^4$ to the piece $d^3$ and pivoting it to the top board of the harvester?

A. No; only this is requisite, that the piece $d^3$ or whatever the parts $d^4$ and D are pivoted to must be fixed, and all other parts of the parallelogram free to move.

X Q. 41. Suppose, that instead of pivoting your strip $d^4$ to your piece $d^3$ direct, you had pivoted it to a slotted plate analogous to Heller's plate $g$, and had secured the latter to the piece $d^3$ thus permitting you, by adjusting the slotted plate higher or lower, to bring the piece $d^4$ just in the proper position to make the extension stand parallel with the edge of the deck, whether necessary or not, or useful or not; in your opinion, would this have altered the principle of your device?

A. Yes, most decidedly, if the bringing of the piece $d^4$ to position for holding the extension parallel with the sides of the table depended upon adjustment in a slot, such adjustment would be required every time that the adjuster was moved, unless, now, the parts were adjusted at first so that the pivot 3 would bear the exact relation to the pivot 4. To do that no slot would be necessary, and I think it not improper to say, that any one making a device with a slot for the purpose, would thus acknowledge that he did not understand the principles involved, because it is plain that the distance between the pivots in the parallel parts of a parallel ruler must be the same, and it would require, on the part of Heller, but a measurement of the distance between pivots of his butter B, which is practically $14\frac{3}{4}$ inches, to determine that his bar D must be $14\frac{3}{4}$ inches. The holes in the bent arm $f$ of his extension are $3\frac{3}{8}$ in. apart; this would establish that *that* the upper end of B and D must be pivoted exactly $3\frac{3}{8}$ in. apart.

234 X Q. 42. Do you mean to say that, with the device represented in your sketch No. 24[a], assuming that the connection between the rod D and the plate $g$, is a pivoted one, it would be impossible so to connect the plate $g$, to the board A, as to cause the extension C to remain parallel with the edge of the table when the adjuster B was swung in and out?

A. No; but I see nothing in Heller's testimony to show that he

did that; I deny that anything of that kind is in the record, and I deny also, that there is anything to show that Heller ever grasped the principle involved, because, I repeat, the slotted piece would never have been made, nor would it ever have been adjusted, because wholly unnecessary.

X Q. 43. Considering all the testimony by the defendants' witnesses, concerning the Heller device, do you consider it reasonable to assume that the connection between the rod D, and the plate *g*, was a rigid one?

A. I have quoted what Heller himself says about it. Rubins says it was a piece to put on the adjuster, to straighten the butts and hold them so that they would not fall down. I have a sketch No. 25[a] which is a copy of the sketch regarding which I have testified, made by myself in presence of, and under instructions of Geo. Heller, which shows an extension stiffly secured to the adjuster. Now, this is the kind of extension, and this only, because projecting beneath the butts, that "would hold them so that they would not fall down." I will say further, an extension which is parallel with the line of grain travel when moving into and out of the binder, could in no way prevent the butts from falling down. Rubins says further, regarding it, "as much as I remember it was not stiff;" and again, "it seemed to be a little loose," and in answer to Q. 11, he speaks of where it was fastened. All of this means, it seems to me, fastened a little loose, or attached a little loosely. In answer to Q. 15, speaking of adjuster and extension, he says: "I do not know how the two were fastened together—don't remember any more." In X Q. 30, Rubins says, in answer, that he "looked at the adjuster very closely;" the question calling for whether he examined it enough to understand its construction fully. Yet he says in the next answer that he does not remember anything more about it. In answer to X Q. 33, he says: "When the adjuster would be thrown with the lower roller more toward the grain, the extension would
235 keep straight towards the butts." This undoubtedly means that it would bear some relation to the butts, and in the next answer he says, "the spring was not strong enough to hold the butts on the binder." (He undoubtedly refers to the spring which overhangs the deck at the butt of the grain.) "This kept the butts in shape," (meaning the board). He means to say that the boards kept the butts from falling; then that board is not Steward's board, because, if parallel with the sides of the table like Steward's, it could exert no influence whatever to keep the butts from falling. In answer to X Q. 36, he says the extension kept the butts in place, presumably from falling down. In answer to X Q. 37, he says: "I saw that when the harvester would shake, the adjuster would move in or out a little, and this extension would keep straight." Does he mean straight with the adjuster? I think so, because that is the only way that would keep the grain from falling. Rubin says, beginning at bottom of page 184, that he saw another one which he says Heller told him "was intended to keep the butts straight;" (A. to X Q. 48) and he says in answer to Q. 50, that the purpose and object was the same. I understand this to mean to hold the butts

from falling, because that is all that Rubin refers to as having been accomplished by the devices. He says, in answer to X Q. 52, that "the iron or extension kept straight with the butts." He further says: "I don't remember how it was fastened on, or other details, except that it would bend there when the adjuster moved." Surely, if it was an extension not jointed to the butter, it would bend.

George Heller says that it was put on to keep the grain straight, and says, "when the adjuster was moved it would move too," and again, "when the butt-adjuster would be slanting, it would be kind of straight down." He says he don't know how it was fastened, but that one "rod had either a slot or some holes in it." In answer to X. Q 59, he says he told Steward the Tuesday previous that "it would move with the adjuster just as that would move and hang down;" and he adds: "I also told him that I did not know exactly how it worked, until I could study over it and see the old one."

All of these witnesses called the butt-adjuster the "little ele-
236 vator," and Rosina Heller does not attempt to be definite until she gets to the answer to Q. 8, and regarding the sheet iron she says: "It kept straight all the time with the bottom of the bundle, and when the little elevator moved, it moved back and forth with the elevator. It holds itself straight in same way with the elevator—straight with the bundle." This means wherever the little elevator be moved, it moved, and it holds itself straight in same way with the elevator. It was then unquestionably a stiff extension. Of course it was always straight with the bundle, if it was thrown rearward so that the bundle would form against it. In answer to Q. 9, she says: "It held the bottom of the bundle straight." I reply, of course, if the bundle formed against it. In X Q. 22, she says that the rod, presumably D, "was always straight, but the sheet iron moved or swung." If the sheet iron swung, then it did not remain parallel with the sides of the table. I have quoted all that the witnesses have said that is in the least definite. There is not a word to show that there was a joint. It is safe to assume that D and $g$ were rigid, because Heller speaks of the lower end of the rod being a loose joint. I do not say that these two parts were necessarily rigid. The stress being a tensile one—a mere chain would answer. Making the connections stiff, would be the most mechanical job, however.

X Q. 44. In the device represented in your patent, if the strip $d^4$ were longer than it is represented, the extension would deflect toward the right-hand edge of the deck, would it not?

A. Yes.

X Q. 45. And if the strip $d^4$ were shorter, the extension would deflect toward the left-hand edge of the deck, would it not?

A. Yes.

X Q. 46. Then, without some adjusting means, like Heller's slotted plate, the strip $d^4$ has to be cut to a certain exact length, has it not?

A. Yes, practically exact.

X Q. 47. Now, does not Heller say, in effect, that instead of cut-

ting the rod D to a certain particular length, he connected it to a slotted plate *g*, in order that he might adjust it to the proper length?

A. No; he says "I couldn't get the length of bar D exactly right, and made this iron to adjust it on." Your question shows that you assume that *g* did not form a part of a parallelogram, but that it was

237 a something by means of which the upper end of the rod D could be adjusted, so that the said rod would be of proper length. Assuming that the upper end of the rod was pivoted in *g*, no movement was possible whereby the length of the rod could be affected; D would be as long one time as another. If too short, it would remain too short, if too long, no adjustment of the plate *g* would shorten it. If the rod D had not been substantially equal to B, (between centres) then no adjustment could by any possibility right the wrong. If his rod D were too short, the extension would swing back too fast; if too long, it would swing out of position forwardly. For every adjustment of the butt-adjuster, a readjustment of something would be required, whereby the extension C could be set to the position required. If D and *g* were joined rigidly, then D would be in effect lengthened, but no better result would be attained, because the extension would still require to be reset. By slotting *g*, Mr. Heller made it possible to reset the extension easily and quickly. It is not possible (if D and B were not of the same length) that the slotted piece *g* could have in any way made the device operate like Steward's, and hence I say, that the joint, if any, between D and *g* is proof positive that Heller's device was not Steward's device.

X Q. 48. In the early part of your present deposition you have endeavored to show, with the aid of a sketch which you have marked 23ª that the Heller device could not have anticipated the Steward patent, because as represented in the Defendants' Exhibit Heller Sketch, the extension would not remain parallel with the lateral edge of the deck, as the butt-adjuster was moved in and out. Is this maint*a*inance of parallelism between the extension and the edge of the deck necessary, in order to constitute an anticipation of your invention?

A. Yes, because in no other way could the board $d^1$ operate substantially as described. I do not mean to say that if its bottom end was a quarter of an inch, or even an inch one way or the other from parallel with the line of grain travel, such departure would cut any material figure. It would render a device, however, more or less in*e*fficient. I will say this, such a departure from parallelism as Heller's device would make would render the extension absolutely inoperative. If he corrected that departure by some adjustment, or if some adjustment, or something was done not automatic, to correct the error, then I say his device was not the same as that of Steward.

238 X Q. 49. Then your patent No. 272,598 does not claim such a device as is represented in your sketch No. 24ª, does it?

A. My only answer to that is, a stiff extension, if it operated, substantially as the Steward board $d^1$ is described to operate, then the

Steward patent would cover it, if prior. But if it did not operate substantially as therein described it would not.

X Q. 50. Provided the connection between the rod D and the slotted plate *g* is a pivotal connection in your sketch No. 24ª would the device represented in that sketch be covered by your patent 272,598?

A. If the rod D and rod B were of the same length and the distance between the supposed pivotal connection and the axis of the adjuster was equal to the distance between the holes in *f* then if the extension C were placed parallel with the sides of the table, it would be covered by the 21st claim of the patent. If constructed as you suppose, the device would be inoperative, and hence covered by nothing. If the proportions were as I have given and the extension C parallel with the lines of grain travel, however, then the patent would cover the device. This being true this device would anticipate the patent if subsequent, of course. I think I have clearly shown, however, that there is nothing in the whole Heller testimony which warrant your assumptions.

X Q. 51. If in your sketch No. 24ª the connection between the rod D and the plate *g* is a pivotal connection and the device were constructed in such proportion as it is fair to suppose that a sane mechanic would construct them with a view to having the extension C maintained substantially parallel planes when the angle of the butt-adjuster changed, would it in your opinion fall within the terms of the 20th and 21st claims of your patent 272,598?

A. Your question is founded upon several suppositions. If you had said if in your sketch the parts were like those shown in the Steward patent would it fall within the terms of the 20th and 21st claims, my answer is, of course, yes. You might as well say if your sketch 24ª was not as your sketch 24 really is, but like something else, would that something else fall within the terms of the patent.

X Q. 52. Would the device represented in your sketch, No. 24ª, whether the connection between the rod D and the slotted plate *g* is a pivotal connection or not fall within the terms of the 20th
239 claim of your patent 272,598?

A. If it would operate substantially as the elements of the 20th claim are required to operate it would, if not, not.

X Q. 53. Suppose, as you have seen fit to assume in your testimony that the connection between the rod D and the slotted plate *g* is a rigid one, and that the slotted plate must be shifted when the butt-adjuster is moved, in order to bring the extension parallel with the edge of the deck, would the device in that case fall within the terms of the 20th claim of your patent 272,598?

A. I do not know of any limitations of that kind that were imposed in the Patent Office. A mere board, below the extension may have been old. If it was, of course that would be a limitation. If it could be shown that that was clearly the equivalent of the board in the patent, then the patent should cover it. If that were prior to the patent, on the other hand, it would limit it.

X Q. 54. Then have you changed your mind as to whether or not mechanism by which the extension shall be caused to stand

parallel with the edge of the deck when the butt-adjuster is moved, would be automatic in its operation, in order to comprehend within the terms of the patent?

A. I have not changed my mind. It should be automatic, but if some one, for the mere purpose of evasion of the patent, made some change that would render the device a little less automatic or a little less convenient, I should consider that his device should come within the terms of the patent. Of course, if the device operated practically the same, because of practically the same means, then it would be practically the same thing.

X Q. 55. Then will you distinctly and definitely admit that the device represented in your sketch No. 24ª, assuming the connection between the rod D of the slotted plate *g* to be a rigid one, and that it is operated according to your interpretation of the testimony of defendants' witness, comes within the terms of the 20th claim of your patent 272,598?

A. This only will I admit: if the device were as a matter of fact like the patent, it would fall within the terms of the patent, or it would anticipate the patent. The 20th claim calls for a moving butt-adjusting mechanism, and a board $d^1$ substantially as described. The substantially as described does not mean that it shall be a board in an obstructive position, or a board that shall never
240 come in contact with the grain. The sketch 24ª represents what I claim that Heller has sworn to; now you wish to know if certain things were, would it fall within the 20th claim of the Steward patent. I have just said that it might, or that it might anticipate. I wish to modify that statement. If Mr. Heller did make a device such as shown in the sketch, or even, if he ever made a device exactly like that shown in the patent and operated it but a few hours, and then threw it aside and applied a device that was diametrically opposite in its operations, then, I say, it would not anticipate, because it would be an abandoned experiment.

X Q. 56. Is that the frankest answer you can give to my question?

A. I will say this, that I do not think the device would be within the 20th claim, because it would be inoperative, in that the board C would form an obstruction, with the adjuster swung in one direction, and would be out of contact with the grain at another extreme of adjustment. If at all times the extension were parallel with the sides of the table or line of grain travel, and that automatically, it would undoubtedly fall within the 20th claim.

X Q. 57. What are the limits of adjustment?

A. From a vertical line to about that shown in the sketch, for an adjuster so short. Or about the same as shown in sketches 22 and 23ª.

X Q. 58. Is your patent intended to cover an extension in connection with an adjuster, swinging from a vertical position through an arc as great as you have described?

A. The greatness of the arc cuts no figure whatever, the patent does not state what the arc shall be. Sufficient to say that the

device should have scope enough to operate in all conditions of grain.

X Q. 59. Now examine your model "Complainant's Exhibit 1880 Model" and state whether in that model the extension remains parallel with the edge of the deck throughout all the positions assumed by the butt-adjuster.

A. Yes, I observe that there is a slight looseness in the joints of the parallelogram.

X Q. 60. Please state whether when the butt-adjuster is in a vertical position, the extension assumes the angle indicated by the line which I have marked *y*, and when the adjuster is swung its left-hand limit, the extension has assumed the angle indicated by a line which I have marked *x*.

241 A. Your line *x* is right, but whether your line *y* is right or not depends upon the direction of the wind. I can put it upon your line *y*, and a slight puff of breath varies the position, all that the looseness of the joints will allow, and that a few hair-breadths away from your line, but still to a parallel position with line *x*. You are not warranted in treating of this technical looseness of the joints in this model, because I have been technical in the matter of the positions of Heller's joints; because in Heller's device, whether it operated upon one principle or a principle diametrically opposite, depended upon the particular way of jointing. You find in the model no means whereby the adjuster extension can be set by hand, independent of the movement of the adjuster itself.

X Q. 61. Will you be kind enough to blow against the butter-extension again, when the adjuster is in a vertical position, and hand the device to me with the extension in the position to which you have forced it by your breath?

A. I blow.

X Q. 62. When you blew against it in that way, did it not force the toggle joint, corresponding to the joint marked 2, in your patent, over the dead centre, so that when the adjuster was swung to the left the toggle levers worked in the wrong direction, and threw the extension to an angle of about 45 degrees, or nearly that, with the side of the deck, when the adjuster reached the extreme left of its sweep?

A. Yes; what of it? The pressure of the straw is always upon the rear face, and in operation the device could never by any possibility so lock. I do not think it a wonderful discovery that in a model so small you should have found looseness in the holes that would admit of a departure from parallelism of a 16th of an inch, and that too when the parallelogram has its sides in the extreme position which permits the board, which is the index of such looseness, to be multiplied to an immense degree.

X Q. 63. What I am trying to get at, Mr. Steward, is what the direction of the wind has to do with the matter, particularly since, as you say, the pressure of the straw would oppose it?

A. This, that the departure from parallelism is so slight that with

my breath I can affect the parts sufficient to bring them parallel, in one position relative to the other, of adjustment.

X Q. 64. Is it any more surprising that Mr. Heller's sketch should have been inaccurate, than that your model should be inac-
242 curate?

A. No; but it is surprising if he intended to make his device operate as that in the patent and model operates, that he should have produced the slotted piece *g*, for what he did, left his tracks, and I have shown, clearly, I trust, that the presence of the plate *g* in his machine is proof positive that his device was not that shown in the patent. If he had made his rod D of the right length, then the slotted plate *g* would have been useless and harmless. He did not get the rod the right length—says that he could not. Had he known what was required, he could have got the length by measuring the distance between the centers on butt-adjuster, which is about $14\frac{3}{4}$ inches. He could have laid D alongside of the adjuster, and marked the distance between the holes.

Adjourned till April 27, 1888, at 10 o'clock a. m.

APRIL 27, 1888—10 o'clock.

Met pursuant to adjournment.

Present as before.

X Q. 65. In adapting some new device to a machine, is it not common among mechanics to adopt the practice, which in shop parlance is called, to "cut and try"?

A. No. If a principle is comprehended no cutting and trying, whatever, is necessary. If Heller had comprehended the principle, it would have been but necessary to make one piece the length of another.

X Q. 66. Suppose that Heller had got his connecting rod the right length, or near enough to the right length for practical purposes, and had pivoted to the angle on the extension, would not one essential still remain to be accomplished, namely, to pivot the upper end in the proper position to cause the extension to stand parallel with the lateral edge of the deck? I am assuming, you will observe, that the upper end of the rod D, in Heller's device, was in fact pivoted.

A. Yes, but no adjustment nor experimenting would be required. The place that your assumed joint would occupy, must have been clearly understood by Heller, if he understood the principles involved. The fact that he "could not get the rod D of the right length," shows that he did not place your assumed joint in the proper position. I am aware that he could have made the whole Steward device, had he comprehended the principles, or, in other words, had he made the invention.

243 X Q. 67. In the Beloit binder, was not the board A above the pivotal point of the butt-adjuster as represented in your sketch?

A. I don't know. I never saw the parts in place.

X Q. 68. Is it not so represented in both your sketch and Hel-

ler's sketch, and is it not shown even higher in your sketch than in Heller's?

A. Heller's sketch does not show. In making my sketch, I assume that the projecting end of one of the bars B passed over the board and beyond its edge.

X Q. 69. Now, suppose that Heller had desired to have his rod so arranged that without boring extra holes, he could easily adjust the upper end of his rod D in the right position, would not the attachment *g* have formed a very convenient means for enabling him to do so?

A. That depends upon circumstances. If what I hold to have been Heller's construction is correct, and I find everything in the testimony corroborative of it, and nothing inconsistent with it, then the plate *g* was a convenience, but if the preservation of parallelism depended upon the principles of a parallel ruler, then the plate would have been utterly useless, and of no convenience whatever. If it is held by the court that Heller's construction did depend upon the principles of a parallel ruler, and your question practically assumes that, then you might just as well ask me if a slotted adjustable joint in a parallel ruler would not be a convenience; in that case, my answer would be, no, but utterly destructive.

X Q. 70. Suppose that after attaching his extension and boring a hole in the upper board to pivot the upper end of the rod, as indicated in the "Defendants' Exhibit Heller's Sketch," Heller found that instead of remaining parallel with the lateral edge of the deck, or more accurately speaking, at right angles with the lower edge of the deck, throughout all positions assumed by the butt-adjuster, it was out of position as in Complainant's Exhibit Steward 1880 Model, would he not have felt obliged to bore a new hole, and reset the upper end of the rod D?

A. No.

X Q. 71. In your sketch, No. 24ª, assuming that the rod D is pivoted to the slotted plate *g*, is the rod D too long or too short, to produce the desired movements?

A. A trifle too short. In his sketch it is much too long.

244 X Q. 72. How much too long is the rod D of Heller's sketch? State the proportion of its length.

A. More than two inches. It should be about 14⅞ in.

X Q. 73. Have you stated the proportion of the length of the rod D in Heller's sketch, or have you stated the quantity in a working device?

A. I have stated what it should have been in the device which his sketch represents.

X Q. 74. Will you now state what I ask you, namely, by what fraction of itself the rod D is shown too long in Defendants' Exhibit Heller's Sketch?

A. As near as I can tell without any instruments whatever, ⅛.

X Q. 75. Then, in order to make it right, should the upper end of the rod D have come above or below the lower edge of the board A, as represented in the Exhibit Heller's Sketch?

A. Lower, of course.

X Q. 76. Then it would be impossible, would it not, to pivot the upper end of the rod D to the board A, and get that rod of the proper length to reach down to the angle *f* of the butt-adjuster, assuming, of course, that Heller's object in constructing the device was the same as your object in constructing your device, and that the location of the board A, with reference to the other parts of Heller's sketch, is substantially correct?

A. You are assuming too much. If his sketch is right, perhaps, yes; if the machine which his sketch represents is the thing considered, no; and here again I find evidence that he never intended to produce a parallelogram, because, if he had, and if, again, the sheet-iron extension ever was on Heller's machine, or rather, if it is the one that he put on in '78, it would not have been necessary for him to produce the sharp bend in the flat bar of the extension; on the contrary, with the hole in the upper part of the bar D as he first sketched it, much less bend would have been necessary. As shown by the marks of the pane of the hammer, he bent this much. Had he understood the principles involved in the Steward device, no bend could have been necessary. But if he depended upon adjustment of the plate *g*, as forming part of D, then the bend would be necessary, because, the more nearly at a right angle to the plane of the extension of the butter the said extension would have been controlled and the less strain upon the parts. It will be ob-
245 served that in the Steward 1880 model, the centres of the arm and extension are in line with the plane of the said extension; so made it would not be very difficult to attach it to the top rail of a harvester.

Counsel for defendants objects to so much of the last answer, as is not responsive to the question.

X Q. 77. Do you understand it to be within your province as a witness, Mr. Steward, to criticise hypothetical questions, or do you understand that to be a matter which concerns counsel for complainant alone, who may object to them if he considers them improper?

A. It is clearly the province of a witness to make himself understood beyond question, and to so place himself that no possible misconstruction can be put upon what he says. I have not criticised, nor shall I, but I will not acquiese in assumptions that are not, in my opinion warranted, because that would be nodding assent to testimony which you are putting on the record, in the form of questions. Please understand me hereafter as not criticising, but as taking precautionary steps so that I cannot, by any possibility, be misunderstood.

X Q. 78. I request that in your answers you will confine yourself strictly to the line of inquiry. Does not Heller say, that he did not attach the rod D at its upper end directly to the board A but attach it to the slide *g* which in turn he attached to the board A and that he did this so that he could get the right length of the rod to reach down to the butter-extension and keep that in place where it ought to be?

A. Both no, and yes; in direct examination he said, "D is fastened on the top board of the harvester," and he says this while describing his sketch, but in cross-examination he contradicts that, using substantially the words which your question embodies, and making his supplemental sketch.

X Q. 79. Now, is it not a fact that if the board A occupies the position indicated in the Defendants' Exhibit Heller's Sketch, with relation to the other parts shown and that if Heller had desired to have his device operate on the principle of a parallel ruler as you term it, he could not, if he had pivoted the rod D to the board, have got that rod of exactly the right length to reach down to the butter-extension, and that it would heve been necessary for him to put on some sort of an attachment to lower the upper end of the rod D as illustrated, for example in your sketch No. 24ª.

246 A. Your question is fatiguing; if you mean would it not have been necessary to attach something to the board A to mount his pivot on, yes, assuming, of course, that the junction is a pivot, but no slot would be necessary.

X Q. 80. What is the reason, Mr. Steward, that you have stopped purring and are showing your claws and your teeth?

A. "I deny the allegation and defy the allegator."

X Q. 81. Do you deny, that in the case which I have supposed in X Q. 79, the slotted plate $g$ would have formed a very convenient means for so locating the upper end of the rod D, as to bring the butter-extension in just the right position?

A. Yes, absolutely useless, no adjustment whatever was called for. There could have been but one position for the axis of movement and that could have been determined by measurements much more easily and quickly than the slot could have been made. If, as a matter of fact, adjustment was called for, then the slot was convenient, but for a purpose that a difference in principle necessitated.

X Q. 82. Are you a mechanical engineer, Mr. Steward?

A. I was elected two years ago, as a member of the American Society of Mechanical Engineers, although I never attended an engineering school. My training has been from actual mechanical work, designing and building machinery of the class involved in this controversy.

Redirect examination by Mr. BANNING:

R. D. Q. 83. Please explain what you regard as the most limited construction that can be given to claims 20 and 21 of patent 272,598, under consideration.

The question is objected to by counsel for defendant as incompetent as it calls for a conclusion of law.

A. The substantially as described, of the 20th claim, as explained in the body of the specification, would require that the board $d^1$ be so connected directly or indirectly with a butt-adjusting mechanism that when the latter was adjusted for the purpose of placement of grain in the receptacle, the said board should always be present and in the proper position to perform the duties required of it,

namely, that of retaining the straws in the position to which
247 they were placed by the adjusting mechanism, and that too, of course, without forming an obstruction to the movement of the bundle out of the receptacle. In short, the most limited possible construction would be: butt-adjusting mechanism capable of movement for the purpose of adjusting to any angle and a board adapted to move simultaneously therewith, but without disturbing its angle. The 21st claim is limited to the means whereby the result is produced, namely, by means of parts forming a parallelogram jointed at its angles.

R. D. Q. 84. You heard Mr. Teats testify as to the conversation between Mr. Gottlieb Heller and himself, in which Mr. Heller said, according to Mr. Teats' testimony, that he had been told to say nothing about the use of a part which I believe is termed the drop-deck. Please explain the significance of any such instructions to him as that.

(Objected to as incompetent, irrelevant and immaterial.)

A. The Milwaukee Harvesting Machine Company for whom Heller is agent own a patent which purports to cover a spring drop-deck similar to that referred to by Teats, granted, I think, in 1882 to Fred. A. Dennett.

R. D. Q. 85. Was that company represented by any one at the time Mr. Heller's testimony was taken?

(Same objection.)

A. Stanley S. Stout was present. He had been for years one of the attorneys for the said company and if I recollect rightly took out the said Dennett patent.

R. D. Q. 86. Were you acquainted with the Beloit binder and harvester, like that in connection with which Mr. Heller testified that he used the "Exhibit Heller Butt-adjuster with Adjustable Extension Parts" 1 and 2? If so, you may explain the construction of such binder in connection with the use of such a device as the Heller butt-adjuster here present.

A. I have seen a machine of their make each year that they built them and the only difference in matters concerning this controversy was that in the 1878 machine the binder table or deck was hollowed at its lower portion, as I will show by a line on the margin of sketch 24ª, marked 1878. The line 1879 corresponds with the upper surface of the lower portion of the deck in the 1879 machine. Heller's sheet-iron exhibit shows a curve at the lower portion,
which, as nearly as I recollect, may have conformed to the
248 binder table of 1878. The chalk line which I have drawn a little distance above it would correctly indicate the upper surface of the 1879 binder. To have fitted this extension to his 1879 binder would have involved but the labor of cutting it, substantially where I have drawn the chalk line, or upon a line slightly higher; if the adjuster to which it was to be attached was narrower, which I think was the case.

R. D. Q. 87. Is this all the change that Heller needed to have made?

A. Yes.

Recross-examination by Mr. DYRENFORTH:

R. X Q. 88. To what extent and how frequently would a butt-adjuster probably have to be shifted in cutting a field of grain of ordinary size, under ordinary conditions—say an 80-acre field?

A. From very few, if the grain is uniform, to many hundred if it is not uniform. A careful operator uses it constantly, because upon the correct adjustment of the grain depends the quality of the work.

R. X Q. 89. Ordinarily, is the extent to which the butt-adjuster is shifted, during the progress of cutting a single field of grain, great or small? I am referring to degree and not to number.

A. Much greater than any other adjustment, more than all others combined, many times.

R. X Q. 90. Do you mean that ordinarily, in the course of cutting a single field of grain the butt-adjuster would be shifted to the opposite extremes of the scope of movement?

A. Yes, I have operated a machine in Mexico, where the ground had been irrigated, where the grain dropped from five feet to less than 12 inches in less than a foot of advance of the machine. I have cut in fields of grain, I may say hundreds of them, in which, to do good work, it was necessary to move the adjuster from position to position every rod or every few rods. I cannot convey a correct idea of the adjuster and the proper adjustment thereof. It must be experienced to be understood.

R. X Q. 91. Now, suppose that in a field the height of the grain were nearly uniform would the adjuster in that case require to be shifted frequently, or might it be set to about the right angle for that grain and maintained exactly, or nearly in that position throughout?

249–252

A. Possibly, but the amount of straw must be considered; I mean what farmers call "heft" of the grain. Also, how the grain "lays;" that is, whether lodged and in what direction, or tangled; whether overripe or still green, whether straight or straw-broken, or whether fluffy or not. All of these conditions render it the more absolutely impossible to explain in answer to your question, so as to be understood by one who has not had much field experience. I will state further that I cannot convey a correct idea of the value of a butt-adjusting device for the same reason.

R. X Q. 92. In the case which I have last supposed, a rigid butt-adjuster, set to about the proper angle, would answer the purpose nearly, or quite as well as an adjustable one would, would it not?

A. Yes, true enough. If adjustability were not required, a butter-extension would not need to be attached to the butt-adjuster so that the latter might be swung.

253 O. S. ELLITHORP, a witness, being duly sworn and examined on the part of the complainant, deposes and says:

Q. 1. State your age, name, residence and occupation.

A. O. S. Ellithorp; age, 41; residence, Plano, Ill.; occupation, mechanic.

Q. 2. Were you ever in the employ of Wm. Deering?

A. Yes, sir.

Q. 3. During what years?

A. I have been with them since December, 1869, and am still with them.

Q. 4. What is your particular line of work?

A. I work in the experimental department of the Deering harvester works.

Q. 5. Are you acquainted with W. F. Olin, patentee of letters patent No. 223,812, of January 27, 1880?

A. Yes, sir.

Q. 6. State whether or not you ever had anything to do with the construction and operation of self-binding harvesters, in which a butt-adjusting mechanism like that shown in the Olin patent was used.

A. Yes, sir, I made a machine for Olin.

Q. 7. Was that before or after the date of this Olin patent?

A. It was before.

Q. 8. Did you make one, or more than one?

A. I just made one.

Q. 9. Was that machine used in any way?

A. It was used in the harvest field.

Q. 10. State how the elevating belt, by which the butts were advanced and adjusted, was driven—from the receiving or from the delivering end.

Objected to by defendants' counsel as incompetent, irrelevant and immaterial. This case has to do with the Olin patent, not with any machine that Olin may have constructed.

254 A. We made one first that drove the adjuster from the receiving end. We afterwards changed it to driving from the upper end.

Q. 11. Like that shown in the Olin patent?

Objection repeated.

A. Yes, sir.

Q. 12. You may state how the machines in which the elevating belt that advanced the butts of the grain was driven from the receiving end operated in actual work.

To save time the above objection is understood to be repeated to all questions throughout this deposition relating to the acts of Olin, or any matters outside of the Olin patent.

A. Well, this adjusting belt, as we call it, was pivoted at the lower end, the upper end was left free to swing back and forth. There

was a double-flanged or grooved pulley on the lower end of the shaft at the pivot end, also a double-flanged or grooved pulley on the elevator roller shaft at the upper end. Those two pulleys were run by a rope or belt.

Q. 13. How did the elevating belt operate in actual work?

A. It was satisfactory in its work in adjusting the grain.

Q. 14. What do you mean by adjusting the grain?

A. Moving it back or allowing it to move forward, so that it will be received by the binder, so that the wire (at that time as it was) was received in the middle of the bundle.

Q. 15. You used a wire binder?

A. Yes, sir.

Q. 16. You say, you afterwards changed to the form shown in the patent, and ran the belt which elevated and adjusted the butts from the upper end. In which way did you get the best work or results, if there was any difference?

A. The only difference was that the way that it was driven from the lower end with the rope, it would slip and wouldn't move the butts of the grain half fast enough, but by gearing at the top end it was more positive in its movements.

Q. 17. What made the rope slip?

A. Slackness.

Q. 18. State whether there was any difference in the speed with which the butt-elevating belt and the main elevating belt were run in the Olin machine which you made and operated as
255 you have described?

A. This butt-belt ran a little faster than the elevator. At that time we had a rake-elevator.

Q. 19. Who paid your wages while you were constructing that Olin machine, and who bore the expenses of the construction of that machine?

A. Gammon, Deering & Steward paid me, I believe; I don't know how the other was done.

Cross-examination by Mr. DYRENFORTH:

X Q. 20. Describe the rake-elevator to which you have referred?

A. The rake-elevator was constructed at that time of two rubber bands, with slats of wood rivetted or nailed to them that carried teeth made of tenpenny nails, at that time.

X Q. 21. What was the width of each belt?

A. I think they was about two inches.

X Q. 22. How far was each belt of the elevator from the nearest edge of the backing board?

A. What is the backing board?

X Q. 23. Is there no such word as backing board in the art, that you know of?

A. Not that I know of.

X Q. 24. Are you familiar with the terms used in the art of harvesting machinery?

A. I think I am.

X Q. 25. In the Olin patent, the board back, under the elevator belts is referred to as the backing board. Was there such a back in the machine to which you have been referring?

A. I think that the board you refer to we called the butt-board in the factory.

X Q. 26. That was the boarding that had the pulleys for the belts at its upper and lower ends and around which the belts travelled, was it not?

A. Yes.

X Q. 27. And what is called the butt-board, is it?

A. Yes.

X Q. 28. How was the adjuster belt made?

A. It was a rubber belt, I think, about three inches wide with pieces of sheet iron bent at right angles and rivetted to the belt.

X Q. 29. Now, to answer my question, will you please state how far each elevator belt was from the nearest edge of that board?

A. The first elevator belt was very nearly underneath this butting board, and at times at the top end, as the top end was *was* adjusted backward, it would come under the butting device.

256 X Q. 30. Where was the other elevator belt?

A. About three feet to the rear of the one underneath — butting device.

X Q. 31. What do you call this device to which I point, in the Winona machine present in the room?

A. That we call the butting device, or adjuster.

X Q. 32. Do you not call it the elevator?

A. No, sir.

X Q. 33. Why not?

A. Because the grain is already elevated before it gets to that device.

X Q. 34. What do you call this part of the Winona machine to which I now point?

(Objected to as not cross-examination.)

A. That is the deck of the binder.

X Q. 35. Is it not the elevator?

A. No, sir; it is not.

X Q. 36. Why is it not the elevator?

A. Because it does not elevate.

X Q. 47. And in the Winona machine what you have designated the butting device or adjuster is a frame having a revolving slatted canvass upon it, mounted over the forward edge of what you have called the deck of the binder, and is parallel or nearly so to the deck of the binder, is not that so?

A. Yes.

By Mr. PARKINSON:

X Q. 38. What do you understand by an elevator?

A. A machine that will elevate anything.

X Q. 39. I mean what do you understand by the elevator of a harvester?

A. The part that elevates the grain from the platform to the binder.

X Q. 40. Where does the elevator terminate in defendants' machine, for instance in the Winona machine before you?

A. At the upper end of the binder deck.

X Q. 41. How long were the projecting ends of the nails in the slats of the Olin machine which you saw?

A. About two and one-quarter inches.

X Q. 42. How far apart were the nails?

A. Five and a quarter or five and a half inches?

X Q. 43. How far apart were the slats themselves placed?

A. I think they were eight inches.

257–259 X Q. 42. How often were the Olin machines, to which you refer, used in the field?

A. They were used at one harvest.

X Q. 44. How often during that harvest to your knowledge?

A. They would go out with it every two or three days, and try it.

X Q. 45. Then what did they do?

A. They would come back and tinker around on perhaps something else.

X Q. 46. What became of the machine?

A. The last I recollect of it, it was stored away in the loft over the office.

X Q. 47. Why was it not kept in use?

A. I could not say why. It was afterwards burnt up, which is the reason we have not got it now.

X Q. 48. Why was it not used further after that harvest, instead of being stowed away?

A. I think it was about that time that Mr. Olin thought of the present device we use, and it was adopted as being better.

X Q. 49. Did you ever see a machine like that Olin machine used after that first harvest?

A. I did not.

Redirect examination by Mr. BANNING:

R. D. Q. 50. Please state just how the rakes in the rake-elevator on that machine were made?

A. We took one of the regular rakes, and took out one or two of the front rows of teeth, so that this adjuster or butting device could move forward or back over the rake without striking the teeth.

O. S. ELLITHORP.

260 CHARLES WHITNEY, a witness produced, sworn, and examined on the part of complainant, deposes and testifies as follows, in answer to questions by Mr. BANNING:

261 Q. 1. State your name, age, residence and occupation.

A. Charles Whitney; age, 53; residence, Chicago; occupation, patents and harvesting machinery.

Q. 2. What experience have you had in connection with harvesting machinery or patents relating thereto?

A. I have been more or less interested in grain-binding patents, and in operating grain-binding machinery for the past 20 years; operating in the field during the summer seasons, and in the factory during the winter seasons. I was a stockholder and director in the Sumner & Whitney Manufacturing Co., of St. Louis, a company organized for the purpose of operating and perfecting grain-binding machinery, from 1873 to 1877. During the four years previous to this I was interested with the Whitney Manufacturing Co., of Rochester, Minn., a company organized for the same purpose; and in the year 1877 I became interested with the Marsh Harvester Manufacturing Co., for similar purposes. I continued with them for three years until the organization of the Marsh Binder Manufacturing Co., of which I became a stockholder and my business pertained to the same things during these various engagements up to 1885. My interests continue in grain-binding machinery and patents pertaining thereto.

Q. 3. Has your experience been such that you are practically familiar with the operations of harvesting and grain-binding machinery in the field?

A. It has. During and since the summer of 1868, I have been in the harvest not less than one month, and sometimes as much as five months each season, operating in the field with this class of machinery; and I think I am quite familiar with the operations of harvesting and grain-binding machinery practically.

Q. 4. Has your experience been such that you are also familiar with patents relating to harvesting and grain-binding machinery?

A. I think it has. I have taken out in my own name twelve patents in this class of machinery, and I have two applications now pending. I have managed, in connection with the attorneys, the patent interests of the companies with which I have been connected, at least to the extent of my own applications, and sometimes directing in reference to infringements, interferences,
262 & 263 defences, etc., I think I am quite familiar with the patents relating to this class of machinery.

264 Q. 129. Have you examined the Wm. F. Olin patent of January 27, 1880, No. 223,812, sued on in this cause, and do you understand the invention therein described and claimed?

A. I have, and think I understand it.

Q. 130. Have you also examined the references offered by the defendants against said Olin patent, to wit, the Green patent of March 6, 1877, No. 188,125, the Elward patent of July 6, 1875, No. 165,316, the Elward patent of May 9, 1876, No. 177,231 and the Watson and Renwick patent of 1853, and do you understand the constructions shown and described therein respectively?

A. I have examined the patents referred to, and understand the construction shown therein.

Q. 131. Have you also examined the testimony of Henry B. Renwick taken by the defendants in this cause, and do you understand the views and positions therein expressed or suggested?

A. I have, and do understand the views therein expressed by Mr. Renwick.

Q. 132. Please explain what you understand to be the Olin invention, described and claimed in said letters patent No.
265 223,812, and state whether or not you find such invention shown, described or disclosed in any of the previous patents offered by the defendants—giving your reason for any opinion you may express and pointing out wherein you differ from the views and theories presented by Mr. Renwick.

A. The invention as described and claimed in the Olin patent above referred to consists in providing means for delivering the cut grain to a binder, so that it may be bound at or near the centre of its length, whether such grain is long or short, and for straightening the grain on its course to the binder. The device consists of a swinging travelling belt located at right angles with the grain-conveyor, and revolving in the direction of the flow of the grain and is provided with means for its adjustment under control of the operator. And the claims of the Olin patent are for the following elements: Claim 1 is for a combination of a harvester elevator and a swinging elevator pivoted at its lower end and devices for shifting its upper end, arranged for elevating the butts of the grain, and delivering grain of different lengths at the same point. The second claim contains the following elements: The horizontal adjustable belt and pulleys, and the main elevator. The elements of the third claim are the adjustable belt with its lower end in front of the line of the grain travel. Claim four is the same belt, the combination with devices for adjusting the same, and claim six, is the same belt and the cover board for sustaining and holding the grain therewith. The devices described in this patent—Olin, 223,812, being for an adjuster for handling the grain and operating as an accelerator for the butts of the grain, the matter of locating this device either on an incline, or a decline or at one end or the other of the grain-conveyors does not change the result. It is equally effective either way, which fact I know from practical use in the field. The language used in the patent for the adjusting device is "elevator belt" and the patent at the same time described its functions as an adjuster and an accelerator, in that the revolving belt moves faster than the grain with which it engages and also moves the grain more or less laterally, as may be necessary for its proper delivery to the binder. And these devices are not contained, or shown, described, or disclosed in any of the patents offered by the defendants.

266 The first model introduced by the defendants' witness, Renwick, in his evidence, is that of the patent to Green, March 6, 1877, No. 188,135, and is evidently intended as anticipating the adjusting device of the Olin patent. The principal feature referred to by the defendants and contained in this patent, is a swinging board, pivoted at the lower front corner of the elevator, and is intended as an adjuster operating to adjust the grain to a binder so that it may be bound centrally whether the same be long or short. In regard to this device, resembling, or anticipating the Olin patent above mentioned I would consider it a failure in every respect. In devices for moving and adjusting grain in its flow to a

binder it is found, by experience and practice quite essential that the surface of such an adjuster which comes in contact with the grain should be not only a moving surface, but should travel faster than the flow of the grain with which it comes in contact. The device as shown in the Green patent being a swinging board, only would act as a retarder, and when brought against the butts of the grain would tend to hold the butts back, thereby letting the heads of the grain gain upon the butts and making the delivery in worse condition with such a device than with none at all. In fact it has been found by actual experience in the field, that such a device answers no purpose for an adjuster. Having operated considerably with it myself, I feel satisfied to assert this as a fact. The model referred to as the Green model is not strictly in accordance with the diagrams of the patent, in that it shows a lever for adjustment, provided with notches, that it may be latched in position. The patent shows no such device, and further, I will say the invention contained in the Olin is not shown in the Green patent referred to for the reason that the Green device shows neither revolving belt, pulleys or means for operating them.

The next patent referred to by defendants' witness, Renwick, is to Elward, No. 165,316, July 6, 1875, and of which he has produced the model. The feature of reference in this Elward patent is placed, in the language of the patent upon the inner shoe of a harvester machine, two vertical pins or shafts, upon which are placed rollers, carrying a short endless apron, and set obliquely to the line of the cut, with the rear end, or roller nearest the elevator,
267 and the patent states that this apron may be operated, either by the friction of the passing butts of the grain, or it may be given a positive movement by gears or belt and pulleys from any convenient driving shaft. Regarding this endless apron alluded to, the inventor has shown no mean s for making it a travelling belt or apron, and that so far as the engagement of the butts of the grain revolve the apron would effect it in many cases it would be just the reverse, as it is a well-known fact by operators in the field that a belt of this nature, when driven by pulleys, is liable to be held or stopped in its revolution by the contact of the butts of the grain with the same. And as constructed and shown in the patent and the model, in my opinion it would be inoperative. It does not anticipate the Olin patent for the reason, first, that it has not a revolving belt, that it cannot be adjusted for long and short grain in that it shows no means of adjustment, and that it does not contain the cover board, necessary to hold the grain down in engagement with the device, and the fact that it was abandoned or not put into practical use by the builders of what was known as the Elward harvester is evidence that it was not a practical operating adjuster, either for keeping the divider clear, or as adjusting grain to a binder. This butter-apron of the Elward instead of acting precisely the same way with relation to the grain moved by and on the horizontal apron, as the butter-belt of the Olin does, as the defendants' witness, Renwick states, in his evidence there would be the reverse effect. The grain would be retarded by the resistance of the belt and this

would tend to deliver the grain in worse condition than if it were not present in the machine. If it should be decided that the Elward is a moving apron or belt, then to be effective it should first, move more rapidly than the grain that comes in contact with it, and should also contain the feature of adjustability, that is the feature of being moved out and in for the accommodation of short and long grain. These features are not contained in the specifications and claims of this Elward patent.

The next patent and model introduced by the defendants' witness Renwick, is to Elward, May 19, 1876, No. 177,231, and the feature referred to as contained in this patent, is:—to the end boards of the elevator frame are hinged two gavelling boards, one at the
267½ front and the other at the rear of the delivery. Those boards are so arranged that they may form a chute for guiding the grain to its delivery and they may be adjusted by bolts or pins on the boards and corresponding holes in the tables for fastening them further apart or closer together as the condition of the grain may require. These are simply stationary chute boards, and inasmuch as they contain no revolving belt and no means under the control of the operator for adjusting them, I cannot see that they contain any of the elements of the Olin patent, or any other practical grain-adjusting devices.

The Olin model introduced by defendants' witness, Renwick, as evidence in this case is not correct in some respects, or does not conform at least in one important particular with the specifications and drawings. The feature that I have reference to in this connection, is the movement of the belt Q; as shown in the model it would not travel as fast as the elevator belts, but it is a requirement, in actual practice that this belt should have a higher speed than that of the main elevator, in order to be effective in engaging the butts of the grain, and adjusting properly to a binder. The specifications and drawings of this Olin patent indicate that the belt should travel faster than the elevator, and therefore I treat it in mentioning it as an accelerator. At the same time it is a deflector or adjuster of the grain to the binder. In describing the claims in this Olin patent I omitted to mention the fifth claim, and I will say here that it is a combination of devices, for operating and driving the revolving belt adjuster. Now, taking up the Olin model and patent again, with the evidence of defendants' witness, Renwick, I wish to point out and correct what I think to be errors in the Renwick evidence.

Adjourned till Friday, December 23, 1887, at 10 o'clock.

DECEMBER 23, 1887.

Said parties met pursuant to adjournment.
Present as before.

In the evidence of Mr. Renwick, he states, "No office or duty, to be performed by the board is described in the patent, either in connection with the butt-elevator or the ordinary elevator."

Referring to the patent I find the functions of the board referred

to, and which is the board R described as follows:—"The
267½ cover for preventing the grain from being blown away as it is elevated, consists of the board R and the spring-arms $S^1$. The board R is located over the belt or elevator Q and is so arranged as to keep the butts of the grain down, so that the belt can elevate them and at the same time permit their passage up the back board" and it must appear clearly from the words of the patent that there is an office or duty which the board performs. Witness, Renwick, further states, referring to the belt Q and quotes from the Olin patent. "Its lower end, is advanced in front of the line of the grain-cutter," and goes on to say, "I am unable to find in the patent any description, which shows what these words mean." I will state that the front of the line of grain travel is that towards the front of the machine in its travel when operating in the grain. This is very well understood, by people who have experience in operating in the field and who make use of such terms of designation. The patent states, regarding this location that the roller I is located between the foot of the elevator and the end of the carrier as shown, it will be seen that no grain can accumulate at that point, as the roller I will move it forward and over the roller under all circumstances, thus keeping the grain constantly in motion, so that it cannot become tangled and clog the elevator. I think this description would be sufficiently clear for a practical man to understand. In quoting from the evidence of Renwick further, I find that he says, when referring to the Olin butter or adjuster belt, "Olin distinctly states that that is one of the duties of his elevator, whereby it forms a means for elevating the butts of the grain." Whether to knock the butts of the grain downward or push them upward it is very clear that the devices in the Olin patent are for advancing the butts of the grain in the line of its travel to a binder. I find further discrepancies in this Renwick evidence, that I will point out as I reach the same in his descriptions of the defendants' machines. Turning now to defendants' machines I will state that I find the elements of the Olin patent referred to above, contained in these machines operating in the same manner to produce the same results namely, the stopping, revolving belt, or apron engaging with the butts of the grain in the passage of the grain to a binder and operating to adjust the same laterally, so that it may be bound
268 at or near its middle and also, operating to straighten the grain in its passage to the binder, and to prevent choking or clogging at the pivot point of the elevator, and that means are provided for making the swinging adjustment of this belt or apron under control of the driver or operator. In perfecting and operating the class of harvesting and binding machinery, of this class to which the defendants' machine belongs it has been found necessary, in order to bind grain of different length in its proper manner to adjust the grain to the binder, or the binder to the grain, or both in the same machine many devices for accomplishing the adjustment of the grain to the binder have been experimented with, but this revolving belt or apron has proven to be a valuable and practical device for the adjustment referred to. In some machines this revolv-

ing adjustable belt of the Olin patent is used on the incline, or elevating part of the machine, and in other cases it is used on a decline, or downward movement of the grain. In the Olin patent it is shown on the incline or upward travel of the grain, but as I understand the patent it may be used upon other kinds of machines and in other positions as relates to the grain-receiving platform and the binder, without changing the result to be accomplished or the mode of operation. Defendants' witness, Renwick, states while referring to defendants' machine, "They have no butter, which elevates the grain, on the contrary, they have a depressor belt which causes the butts of the grain to descend." In regard to this statement I wish to say, that in my opinion, the defendants' machine contains a butter in the shape of a revolving belt or apron engaging the butts of the grain, and that it is also an accelerator instead of a depressor in that it moves faster than the flow of the grain with which it engages, or in other words, the defendants' machine contains a rotating, swinging belt to advance the butts of the grain and to adjust the same to a binder. In this the defendants' are identically the same as the Olin. Renwick further states in his evidence that the butter of defendants' is not combined with the main or harvester elevator which is elevating grain. In regard to this I will say that the defendants' machine does contain a butter working in connection and combination with the elevator of a harvesting machine, and is a very essential feature to the successful operation of defendants' machines in that — engages with the grain and prevents clogging or choking in the elevator. Witness,
269 Renwick, states again that in the Olin the "upper end of the butter is adjusted, and necessarily so, while in the defendants' the lower end is adjusted, and necessarily so." In relation to the travel of the grain in its passage from the grain-receiving platform to a binder the adjusters referred to are pivoted so that the outward end or that end nearest the binder is capable of adjustment, for deflecting the grain. Witness Renwick has further stated in his evidence that "defendants have no butt-elevator, nor even a butt-depressor in combination with the main elevator apron, neither do they use the board R." In this respect I will say the defendants do use a sheet-iron cover board corresponding with the board R of the Olin patent and operating for the same purposes. Witness Renwick seems to lay great stress upon the name he uses in describing defendants' butt-adjuster, calling it in many cases a butt-depressor. I think the word depressor in this connection is seldom or ever used. In fact it seems to me to be the opposite of a depressor, for as a matter of fact it is an accelerator, and instead of embarrassing the flow of the grain it increases its movement. In fact, among the farmers, in many cases it is called the little elevator, as I have often heard, when describing this butt-adjuster. Witness Renwick states, "the packers are not an elevating apparatus, but on the contrary a depressing apparatus for forcing the grain downward on the deck, and that the term elevator had a definite significance, as applied to grain-binders, long prior to the date of the Olin patent." I will say that so far as the elevator is concerned it is only

a means for getting the grain over the drive-wheel, and so far as conveying the grain from the cutting apparatus to the binder the adjuster and packer teeth only form a part of the means for that purpose. In my evidence describing the various devices used in this connection including the models and patents exhibited by defendants in evidence, I have some diagrams which I will introduce and which will explain more clearly my ideas as set forth in my evidence regarding the various devices referred to. First is one marked Geo. F. Green patent, No. 188,125.

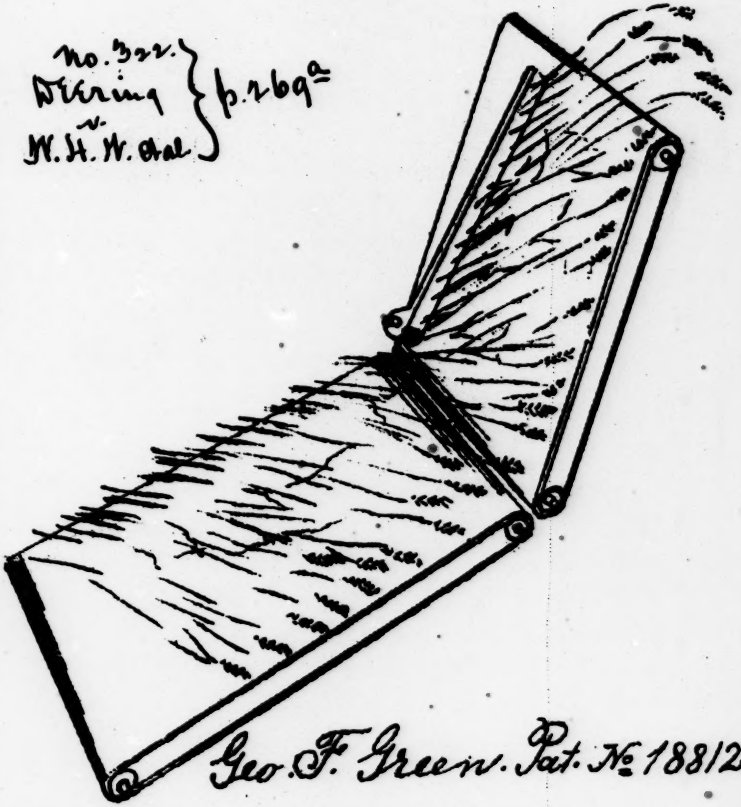
(Here follows diagram marked 269*a*.)

The next diagram is a sketch illustrating the retarding effect of Elward's belt G, patent 165,316. The first-mentioned diagram illustrates the retarding effect of the device on the grain in its movement toward the binder. The next diagram is Elward's patent No.
270 177,231, sketch showing retardation of the butts. The next diagram is one of the Olin patent, No. 233,812, and one of defendants' machine. These diagrams are to illustrate the accumulation and the flow of the grain to and on its way to the binder, and show the path of the grain travel in the two machines, defendants' and Olin's. The next diagram is sketch showing reversability of position of defendants' device, Olin's position and dotted lines showing defendants' position. This sketch clearly shows the case of adaptibility of the Olin device to the position as it is used on defendants' machine. The next diagram is Olin's belt Q changed to a position of defendants' and still vertical to main elevator and showing board R and other lettered parts of Olin's machine. The next sketch is marked "Sketch A and Sketch B" and described as sketches showing the advancing action of adjuster canvas in defendants' machine. The next sketch I wish to introduce is marked "Miller's Buckeye binder, patent 390,931," and shows the rotating swinging butter on the incline or elevating part of the harvesting machine, and also contains dotted lines showing the position of defendants' elevator relative to binder and adjusting belt. The next diagram is a sketch illustrating the action of the adjusting belt upon a swath of flowing grain. This sketch shows the operation and effect of the revolving-belt adjuster on the grain as contained in the Olin patent.

(Here follow diagrams marked pp. 270*a*, 270*b*, 271, 272, 273, & 273*a*.)

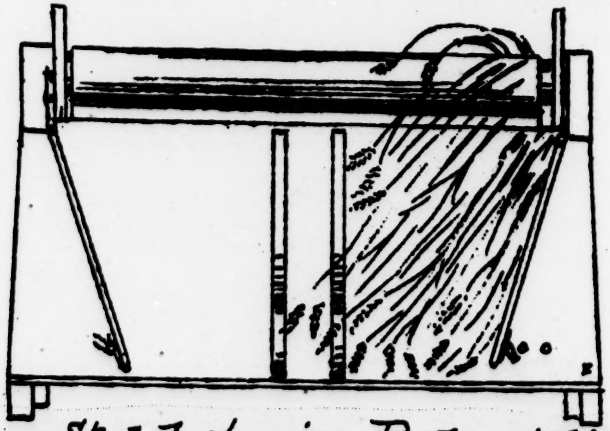
These diagrams and sketches introduced are intended and do show the mode of operation of the various devices in controversy when handling grain, in actual practice or use in the field, and are in my opinion correct representations of such operations as they describe. They are also intended as an aid and to give better and easier understanding of the descriptions in my evidence describing such devices. I will say, in conclusion, that my description of the devices under discussion and their mode of operation is based upon the drawings and specifications and diagrams and models referred

No. 322.
Deering
v.
W. H. W. et al
p. 269a



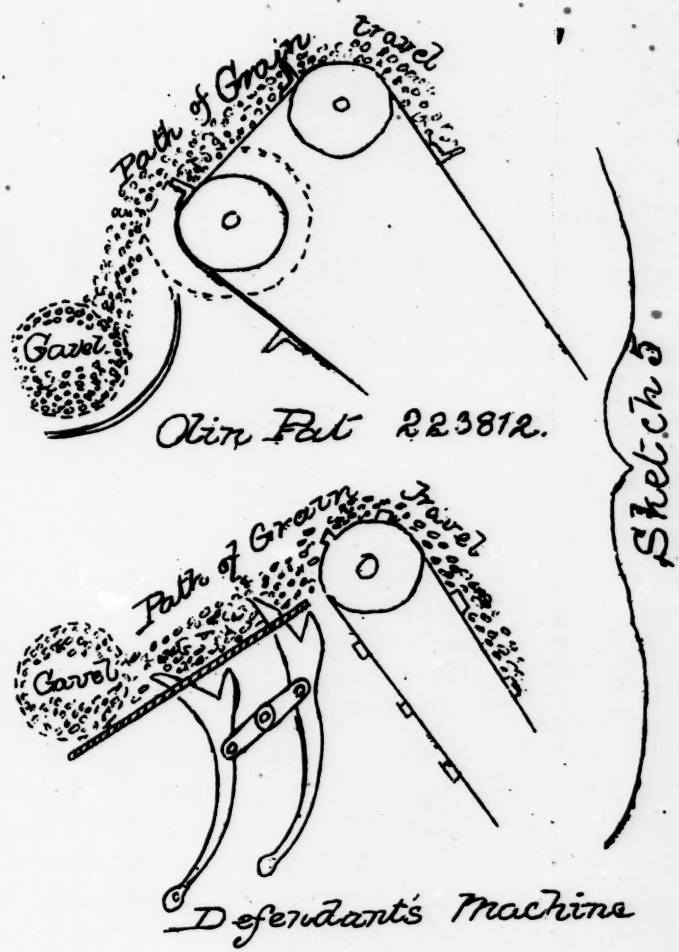
Geo. F. Green. Pat. No. 188125

Elward, Pat. 177231.



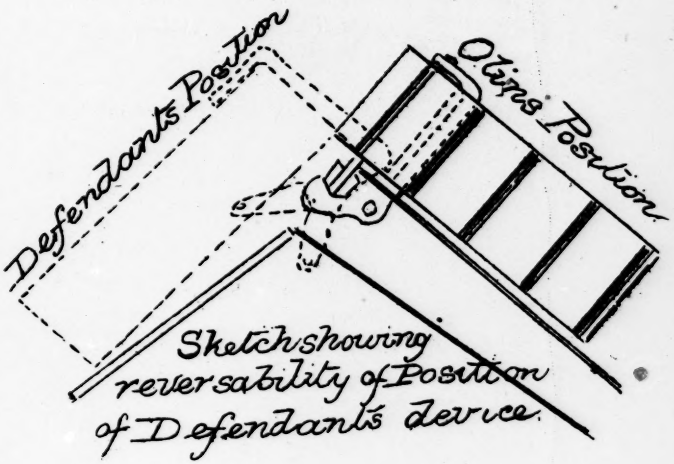
Sketch showing Retardation of Butts.

No. 377. Dressing v. W.H. to Ebel } p. 270a




No. 322.
Deering
v.
W. H. W. et al.
p. 270b

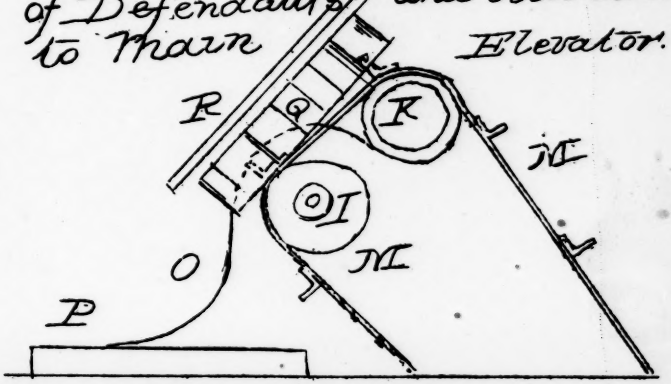
No. 3 ... } p. 271
Dr. Ering
v.
W. H. W. chal




Sketch showing reversability of Position of Defendant's device.

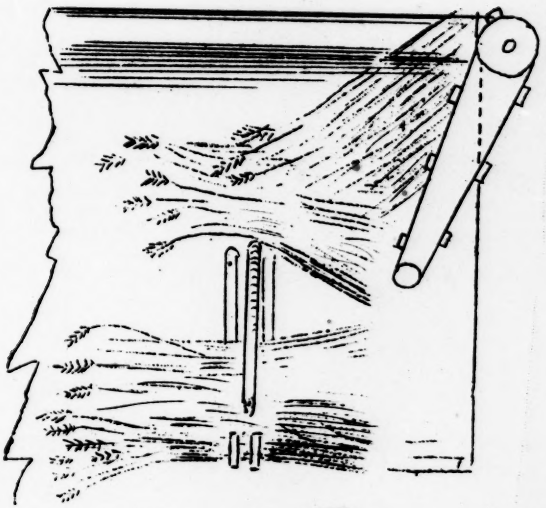
Sketch 7.

Olin's Belt Q, changed to position of Defendants and still vertical to Main Elevator.

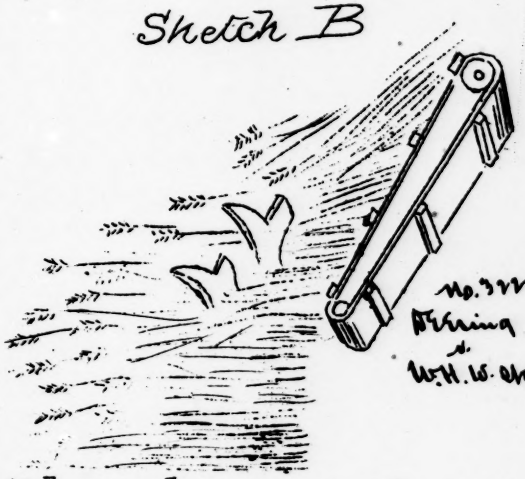


Sketch 9.

Sketch A

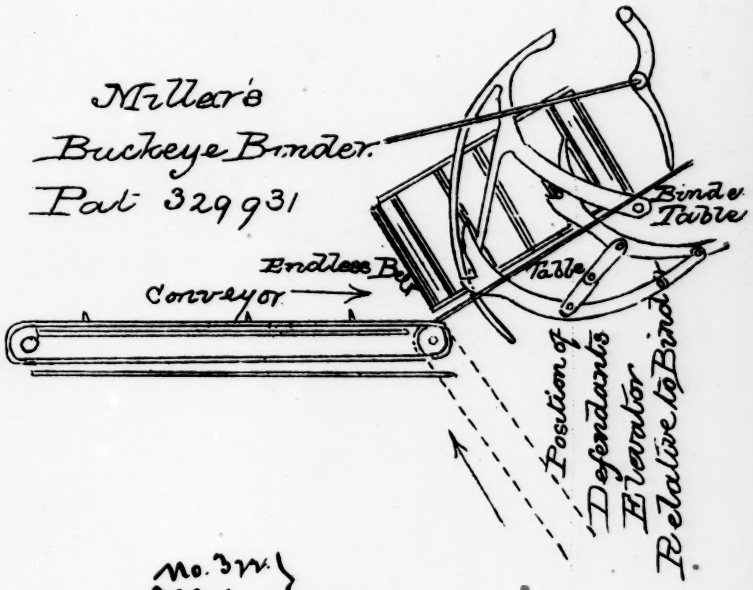


Sketch B




Seetches showing advancing action of Adjusted canvas in Defendant's machines

Sketch 9.

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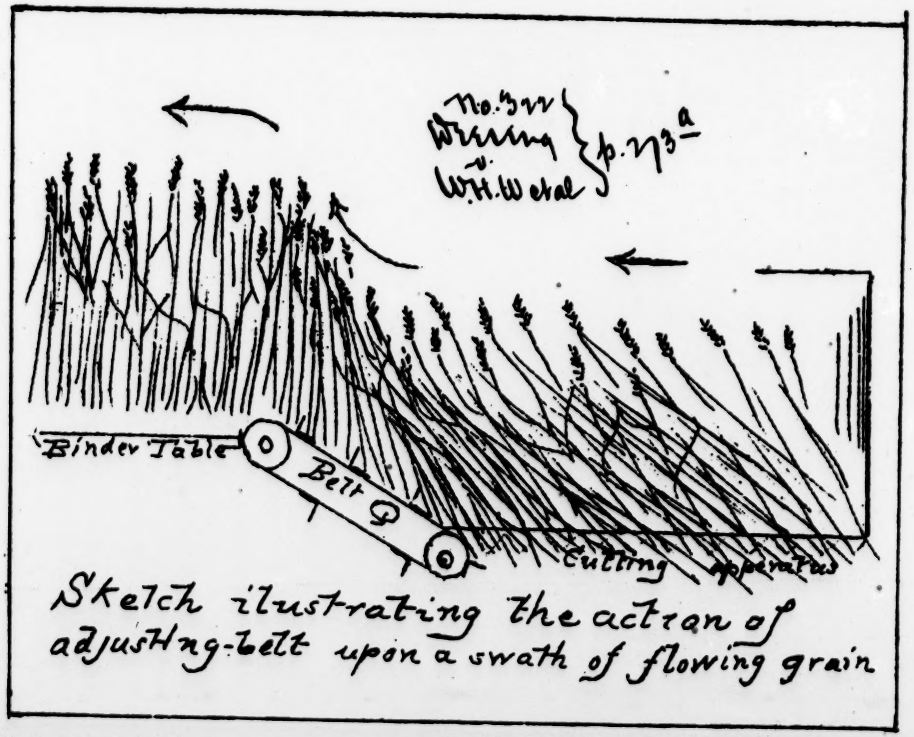


Sketch illustrating the actran of adjusting-belt upon a swath of flowing grain

to, and from actual experience in practical operation in the harvesting field, and my reasons for disagreeing with the witness Renwick in such features as I have called attention to are warranted by the specifications and claims and models and machines alluded to and the records I have referred to at such times in such errors as I have pointed out in the Renwick evidence.

274 In regard to the patents and models of defendants' exhibit, namely, the Green patent, No. 188,125, the Elward patent, No. 165,316 and the Elward patent 177,231, I am unable to find the devices or their equivalent in any particular and they do not contain the elements or devices as described and contained in the Olin patent No. 223,812, for reasons already given by me, regarding these several patents. But I do find all the elements of Olin's adjusting devices contained in defendants' machine operating in the same manner to produce the same results notwithstanding everything shown in these prior patents, even if they be considered as limitations.

Defendants object to so much of the foregoing answer as relates to the construction of the Olin patent, to the question of its utility and its infringement, as not competent rebutting evidence and as merely cumulative upon the affirmative evidence taken in behalf of complainant before closing their *prima facie* case, and without waiving the objection thereto proceed, under protest to cross-examine.

Cross-examination by R. H. PARKINSON, for the defendants:

X Q. 133. What manufacturers of grain-binders have to your knowledge put upon the market grain-binders having a swinging elevator combined with the main elevator by being pivoted at or near the lower end of the main elevator, and forming a means for elevating the butts of the grain while the grain is being carried up by the main elevator in the manner exhibited in the Olin patent?

A. Whilst there are several manufacturers who have made machines with the swinging elevator alluded to in the question placed upon an elevating table I will say that Aultman, Miller & Co., of Akron, O., have produced a similar arrangement and put upon the market large numbers of them.

X Q. 134. The elevator to which I specifically referred in my question was not what it has served your purpose to term an elevator, namely a canvas operating on the butt of the grain on the binding table after the grain has ceased to be operated upon by the main elevator but was, as carefully stated in the question,

275 "A swinging elevator combined with the main elevator by being pivoted at or near the lower end of the main elevator, and forming a means for elevating the butts of the grain while the grain is being carried up by the main elevator, in the manner exhibited in the Olin patent." Bearing in mind the terms of this question, please state the names of all manufacturers who have put upon the market, or are putting upon the market such a device.

A. In my answer I had no reference to a canvas operating to de-

press the butts of the grain on the binding table, after the grain has ceased to be operated upon by the main elevator. On the contrary, I had reference to the swinging butt-elevator, as operating in connection and in unison with devices to elevate the grain to the binder. In addition to Aultman, Miller & Co., machines of th character and containing the devices alluded to are manufactured by C. Aultman & Co., Canton, O., and the Marsh Binder M'f'g Co., Sycamore, Ill., Emerson, Talcott & Co., Rockford, Ill. These firms are the only ones that I think of now, that have manufactured and put upon the market any considerable number of machines constructed in this manner.

X Q. 134. During what years have the companies named in your last answer have upon the market grain-binders, having in combination with the main elevator of the harvester a swinging elevator pivoted to the lower end of the main elevator, and forming a means for elevating the butts of the grain while the grain was travelling up the main elevator as exhibited in the Olin patent. Please answer this having in mind that the question does not refer to a swinging butter on a binding table as exhibited in defendants' machine, but to the particular construction shown in the Olin patent.

A. The machines referred to have been manufactured and put upon the market for the last five or six years, and now if your question has reference to any specific mode of construction, other than teeth or fingers engaging with the grain to elevate it I might explain that in construction there would be found this difference, that in the Olin elevator, the means employed for engaging with the grain to thus elevate it, are teeth, attached to a revolving belt or belts, whilst in the machines that I have reference to as having been constructed and put upon the market, employ teeth or their equivalents operated by revolving cranks.

276 X Q. 135. I now understand that the machine to which you have referred as made by Aultman, Miller & Co., and others are not machines of the character referred to in my question but are what are known as low-down binders in which there is a swinging-butter canvas on the binder table opposite the sweep of the binder arm. Now, bearing in mind that I am asking you about a combination of the several devices as exhibited in the Olin patent, and limiting my question to a "harvester elevator" which elevates the grain from the harvester platform to an elevated binder table and delivers it on that table before the binding mechanism begins to operate upon it combined with a swinging elevator pivoted at the lower end of such harvester elevator and forming a means for elevating the butts of the grain and delivering it to the binding table in the manner shown in the Olin patent, please state what, if any, manufacturers have placed on the market such a machine.

A. The machines referred to in my answer as above contained all these elements as shown, and, I think, as described in your question; for explanation I will say the harvesting machine referred in my answer contains the revolving belt or apron pivoted at or near the lower end of the elevating apparatus and the grain is received from

the grain-receiving platform at its delivery end by elevating teeth or fingers and revolving roller all working in unison to elevate the grain and adjust it to the binder, which binder is located at the upper end of these elevating devices.

X Q. 136. The machines to which you have referred as made by Aultman, Miller & Co., and the other parties named in answer 133 were all what are technically known as low-down binders, having what you have termed the elevator, that is, the canvas that operated on the butts occupying about the same position relative to the binding and packing mechanism as is occupied by the swinging butter on the binding table of defendants' machine, were they not?

A. I think the proportions would not vary much in either case, however, on the machines referred to as being constructed by Aultman, Miller & Co., the revolving-belt adjuster, or elevator, or deflector, and I will say, regarding the belt, that I do not understand it to make any difference what term or name is used to designate this revolving swinging belt. The operations are the same and for the same purpose in any of the events referred to. The
277 revolving belt is somewhat longer in relation to the binding parts. The machines that I have referred to as containing this revolving-belt adjuster on the incline, or elevating part of the machine I think were usually termed low-down binders, and I think they were so termed from the fact that there was not so much of the carrying or elevating process employed in these machines as in others common in use.

X Q. 137. The manufacturers to whom you have referred as making this low-down binder also make an elevated binder using a main elevator and an elevated binder table, arranged substantially as shown in the Olin patent, do they not?

A. I think there is some similarity.

X Q. 138. And on these elevator machines referred to in my last question, they do not use a swinging butter operating on the grain while it is being carried up the main elevator of the harvester, but use a swinging butter on the binder table, in substantially the position shown in the defendants' machine and in the Appleby and Bullock patent of 1882, is not this so?

A. As a matter of fact they manufacture a machine corresponding, in all essential respects to the defendants' machine and containing the swinging revolving adjuster operating to engage the grain in its flow to the binder.

X Q. 139. Much the larger proportion of machines manufactured by the parties named during the last five years have been of the character described in my last question, have they not?

A. I think that is a fact.

X Q. 140. What manufacturer has put upon the market a grain-binder having an elevator of the type of the main harvester elevator shown in the Olin patent, a binder deck located below the upper end of that main elevator, so that the grain as delivered from the main elevator would fall on that binder deck, binding mechanism, so located on the binding deck on which the grain was thus deliv-

ered after falling from the harvester elevator that such binding mechanism began to operate upon the grain after it was delivered from the elevating apron of the harvester, and a swinging elevator pivoted at or near the lower end of the harvester elevator, and operating upon the butts of the grain while the grain was being carried on the harvester elevator from the platform to the
278 binder deck, above described.

A. I think the machine manufactured by Aultman, Miller & Co., that I have before referred to, contains all the essential elements and operating in a similar manner to produce similar results as the one described in the question.

X Q. 141. I have not asked you what you consider the essential, and what the non-essential elements of the construction recited in the last question. I assume that from your standpoint everything that distinguishes the construction shown and claimed in the Olin patent from the machines that have been manufactured and sold by the complainant or the defendant or any other manufacturer is non-essential. I want you to state what, if any manufacturer has made and sold a machine corresponding in terms to the description of my last question.

A. I supposed my last answer would be clear enough when I stated that the machine manufactured by Aultman, Miller & Co., to which I have referred would answer to your description, or to the description in your question.

X Q. 142. Then I shall understand, shall I, that you wish to be understood as stating of your own knowledge that Aultman, Miller & Co., have made and sold grain-binders having an elevator of the type of the main elevator shown in the Olin patent, a binder deck located below the upper end of such main elevator, so that the grain as delivered from the main elevator would fall on that binder deck and would only be operated upon by the binding mechanism after having so fallen from the grain-elevator, and a swinging elevator pivoted on or near the lower end of the harvester elevator above described, and operating upon the butts of the grain, while the grain was being carried on the harvester elevator from the platform, to the binder deck, situated as above described.

A. I think that is a fact with the exception of one feature, and that is that the binder devices would not be located below the elevator.

X Q. 143. What you term elevator, when speaking of this Aultman, Miller & Co. machine, is the mechanism, that is moving the grain forward on the binder deck, in other words, the teeth that push the grain forward into the grasp of the binding mechanism, is not this so?

A. No; this is not all the elevating mechanism of the machine referred to. In this machine referred to there is employed
279 other elevating and moving devices to receive the grain from the main receiving platform, and conduct it to the binder.

X Q. 144. In the Aultman, Miller & Co. machine above referred

to, the butter-apron extends along the deck on which the binding is done, and serves to move the grain on that deck, does it not?

A. If you mean by deck the inclined plane up which the grain is elevated, the revolving swinging butt-adjuster is so situated.

X Q. 145. Now please answer my question. I asked whether in the Aultman, Miller & Co. machine, to which you have referred, if it was not a fact that the butter-apron extended along the deck upon which the grain was bound, and served to move the grain on the deck? Please answer yes, or no.

A. Yes, I think the adjoining belt or butter, extends part way up what you term binder deck. I will say further that I want to be understood that my answers to the questions relating to this Aultman & Miller machine referred to, are given from my recollections of the construction of the machine in its actual use, as I have seen it operating in the field.

Adjourned till 10 o'clock Saturday, December 24, 1887.

DECEMBER 24, 1887.

Met pursuant to adjournment.
Present as before.

X Q. 146. The Aultman, Miller & Co. machine to which you have referred as containing the several elements of the Olin patent combined as exhibited in the patent, is a machine constructed as shown in the cut I now show you, is it?

A. I think the cut referred to shows the machine in all essential features as the Aultman, Miller & Co. machine to which I have referred.

The cut referred to is here offered in evidence, marked Defendants' Exhibit Aultman, Miller & Co. Low-down Binder.

X Q. 147. The other machines to which you have referred in cross-examination as containing the elements of the Olin patent combined substantially as exhibited in that patent, would correspond substantially with that shown in the last-mentioned cut, in so far as the construction and relative arrangement of platform, binding table, moving mechanism and butter, would they?

A. Yes, I think the cut referred to shows the essential features as mentioned.

280 X Q. 148. Am I to understand then, that you do not know of machines being put on the market having an elevator apron or belt similar to that shown in the Olin patent, a binder platform below the upper end of such elevator onto which the grain falls after passing from the control of the elevator, and a swinging elevator pivoted to the lower end of such harvester elevator, and operating on the butts of the grain while being carried up by such harvester elevator so as to be discharged from the elevator onto the platform below it in the position in which it is to be bound?

A. No, I do not think I have seen machines put upon the market and operated, containing the features as described in your question, exactly.

X Q. 149. The harvester elevator, shown in the Olin patent, is of the type commonly known as Marsh harvester, is it not?

A. I think it would be considered as one of that type, or as one of many types bearing that reputation.

X Q. 150. The term of the Marsh harvester is commonly applied to harvesters having an elevator up which the grain is carried by a travelling belt or apron, and a binder platform below the top of such elevator onto which the grain falls as it is delivered from the elevator apron, is it not?

A. I think your question sufficiently describes one class of machines so designated.

X Q. 151. If my question does not state the distinguishing features of the Marsh harvester, that is, the characteristics of the machine, which are indicated when it is referred to as the Marsh type, will you please give a definition of that term as commonly used in the art, which is more accurate.

A. The machines known as Marsh harvesters that I have been familiar with, as used in the field for the last 26 years, or over, are constructed with a grain-receiving platform, upon which the grain is first received as it is being cut and conveyed to an elevator which carries it to binders either manual or automatic, and in this construction for so carrying the grain and elevating it, various devices for such carrying and elevating have been resorted to; in some cases an endless apron, or belt, is used, as you have designated in your question, while in many cases this carrying and elevating is accomplished by the aid of teeth, and operated by revolving cranks.

281 X Q. 152. What Marsh harvester did you ever know put on the market in which the grain was not carried up the elevator by means of either an apron or belt, but was carried up by means of a revolving crank?

A. One machine that I am familiar with, and that was manufactured and put upon the market in large numbers, and constructed for manual binding, and also automatic binding was manufactured by the Sandwich Mfg. Co., at Sandwich, in the State of Illinois.

X Q. 153. During what years?

A. Commencing, I think, as early as 1870, and continuing for at least 10 years.

X Q. 154. Do you mean to say that the machine manufactured by the Sandwich Mfg. Co., for some 10 years subsequent to 1870, was one which did not use an endless carrier or belt to lift the grain from the platform and discharge it upon the deck where it was bound?

A. I do.

X Q. 155. Where was the deck situated, as compared with the grain platform?

A. The deck was situated, if you mean by deck, the table of grain receptacle, at the termination of the carrier alluded to in my answers above.

X Q. 156. My question was, as to the position of the binding deck,

as compared with the platform. You do not answer this, please do so.

A. I will try to make it more clear: I thought I had answered it. Between the carrier platform and the deck or grain receptacle which I think you mean by deck, or the elevating parts alluded to, and at the termination of these elevating parts of the machine was situated such receptacle.

X Q. 157. Did the elevator and the deck occupy, with reference to the platform, about the same relative position as shown in the Olin patent?

A. It did, with this exception, the teeth on the Olin elevator continued further around the head of the elevator, and down toward the grain receptacle in their engagement with the grain.

X Q. 158. Can you state in accordance with what patent this Sandwich machine was made?

A. It was manufactured under several patents, among which were the Marsh and Low.

X Q. 159. Would either of these patents show the arrangement of the deck and the mechanism, which you have termed an elevator?

A. I think so.

282 X Q. 160. This Sandwich machine has substantially the arrangement of elevator and deck shown in the Low patent No. 132,970, has it?

A. I think it shows substantially the arrangement of the Sandwich machine referred to.

X Q. 161. Is not the term Marsh harvester, or elevating harvester frequently used in the art to distinguish the type of machine in which the grain is carried up an elevator to a point above the binding table, and drops upon the binder table as delivered from the elevator, from the type known as low-down or platform binders?

A. Yes, I think, in many cases the name Marsh harvester is applied to designate that class of machines to which you have referred.

X Q. 162. The complainant and defendants' machine in this case would fall within the class designated, Marsh harvesters, or elevating harvesters, would they not, as these terms are commonly used?

A. I think they would.

X Q. 163. The same would be true of the machine shown in the Olin patent, would it not?

A. I think so.

X Q. 164. The machine heretofore referred to as the Aultman, Miller & Co., machine would fall within the class commonly designated "platform" or "low-down binders," would they not?

A. They would.

X Q. 165. More than 95 per cent. of the grain-binders sold during the last ten years have been of the elevator or Marsh harvester type, as distinguished from the "low-down" or "platform" have they not?

A. I would not be able to say what per cent. but to a great ma-

jority of the machines manufactured for the last ten years, I think the designation Marsh harvester would be applied.

X Q. 166. You would not think the percentage indicated in my question was too high, would you?

A. Probably not.

X Q. 167. Neither the complainant, nor other manufacturers of machines of this Marsh harvester type have, so far as you know placed on such machines as put upon the market, a swinging elevator, pivoted at, or near the lower end of the harvester elevator and forming a means for elevating the butts of the grain while the grain was travelling up the main elevator, have they?

A. No, while they use the swinging butter alluded to they do not place it as designated in your question.

283 X Q. 168. They all use a butter-apron on the binding deck in such position that it will not begin to operate upon the grain until after the grain has passed through the control of the main harvester elevator and so driven that the butter-apron would operate in same direction as gravity instead of in the opposite direction, do they?

A. To a certain extent that is true, but this butter operates upon the grain to deflect it, or move it laterally. This is one of the important functions of this butter belt, or apron.

X Q. 169. They all use it in substantially the same position as in defendants' machine and as shown in the Appleby and Bullock patent, do they not?

A. I think they do, however, at present, my recollection is not clear as to the patents referred to, but I think it to be in all essential features the same.

X Q. 170. They all use it with the butter-apron driven downward, rather than upward, so that if the greater weight of the butts of grain tended to throw the grain out of line, the effect of the butter-apron would be in the same direction of gravity rather than the opposite direction, do they not?

A. Yes, the defendants' machine use this revolving swinging butter placed in relation to the flow of the grain with which it engages, parallel, but as relates to gravity, it is partly downward in its position, or in other words, placed on a decline instead of an incline.

X Q. 171. The same is true of the complainant's machine, and of the other grain-binders of the Marsh or elevator type before referred to, is it not?

A. I think it is.

X Q. 172. They all use it, in such position that it does not begin to operate upon the grain, until the grain has been delivered from the operation of the harvester elevator, do they not?

A. I think it is so placed on the machines referred to in your question, that it works in unison with the elevator and other grain-carriers, and receives its motion from one of the elevator rollers and engages the grain in its flow at the elevator, and also operates to keep the elevator clear, or from choking at the point where the

elevator and butter-canvas work together to force the grain in its onward course to the bundle receptacle.

X Q. 173. Now please answer my last question.

A. I will endeavor to make my answer clear enough to be understood. If you mean by delivery a stoppage of the flow of
284 the grain, then it does not, but if you mean by delivery the flow of the grain after it shall have passed the elevator at this point in its passage to the binder, then they do

X Q. 174. I have twice asked you a perfectly simple question, capable of being answered by yes or no, and in nowise suggesting that I intend to use language as meaning diametrically opposite to what the terms indicate. Now, while making any assumption you please as to the use of the language of complainant's patent, and inverting or evading its significance as you please, when testifying about the construction of the patent, please when asked a direct question by me answer it with the understanding that I use language in its ordinary significance. I want you to state whether it is, or is not a fact, that all the machines referred to use the butter-apron in such position that it does not begin to operate upon the grain until the grain has been delivered from the operation of the harvester elevator. You may understand that by harvester elevator I mean the elevator corresponding to what is so designated in the Olin patent, namely the elevator which carries the grain up the incline from the platform, and discharges it over the top, whence it falls to the binder table. Now, please answer yes, or no.

By Mr. BANNING: Counsel for complainant instructs the witness that it will be proper for him, if he so desires, to explain what he means by answering "yes" or "no," in case he gives such an answer; that is, to explain the sense in which he uses the word "yes" or "no."

Counsel for defendants objects to the suggestion made to the witness during cross-examination as to the form of his answer, but states that as the witness' use of terms seems to be in many respects original and peculiar, he thinks it may be necessary for the witness after answering the question to explain with what meaning he uses the terms "yes" and "no," and in the same connection whether he uses them with the same significance or with the opposite significance in answering different questions.

A. Yes, I think the revolving-belt adjuster referred to engages with the grain in its flow toward the binder after its passage through the upper rollers of the elevator alluded to.

285 X Q. 175. All the binders of the Marsh harvester, or elevator type now, or for the last 10 years upon the market, have some provision for adjusting the self-binder, with reference to the harvester elevator to enable it to bind the grain centrally, have they not?

A. Yes, in most cases I think that is true; however, in some cases machines of this class were made with stationary binders, and the adjustment of the grain depended entirely upon the adjustment of

the grain to the grain-binder entirely, at least in cases where the binder was fixed and held in place rigidly.

X Q. 176. What manufacturers are making, or have on the market, a machine such as is described in the last part of your answer?

A. At the present time I am not certain that such machines are being manufactured and put upon the market. However, they were manufactured in considerable quantities, a few years ago.

X Q. 177. By whom?

A. By the Marsh Harvester Mfg. Co., and by Wm. Deering.

X Q. 178. How long since Wm. Deering abandoned that construction?

A. It is several years, but I can't be positive as to the exact length of time since he commenced using the sliding adjustability of the binder.

X Q. 179. His binder has been made adjustable with reference to the harvester elevator ever since he begun to use the swinging butter on the binding platform, is it not?

A. No, it was used by Mr. Deering prior to the use of this butter, but in the machines that he manufactured with this butter-adjuster on for the first two years, did not contain the adjustability alluded to.

X Q. 180. Have not all his machines for some years past had the binder adjustable with reference to the harvester elevator?

A. Yes; for some years past.

X Q. 181. Do you know that he had the binder for more than one season, with the swinging butter on the deck, before he made the binder adjustable?

A. Yes, I know that he used the butter in connection with a fixed binder at least two years prior to adopting the adjustability of the binder, when constructed with this adjustable device or butter.

X Q. 182. Do you know that during the year or two that Deering omitted the adjustable feature of his binder, there was
286 pending or threatened against him, and others, using this feature, a suit for infringement of a Gordon patent which was claimed by the patentee to cover such adjustment, and that after Deering resumed the use of the adjustable binder, a suit was brought against him on that Gordon patent, on account of such use, which suit is still pending?

A. I do not know at what time, or at what stage of his manufacturing, such suit was threatened, but I understand that a suit for the feature under the Gordon patent against Mr. Deering, and others, is now pending.

X Q. 183. You have stated that the butter-apron marked G in the Elward model was not put into practical use in the position there shown, and have said that this was evidence that it was not a practical operating adjuster; would you regard the facts that the complainant while building extensively a grain-binder having an elevator similar to the harvester elevator of the Olin patent has never put the swinging elevator on that harvester elevator in the position shown in the Olin patent or in any position which would enable it to deflect the grain towards the opposite side of the main elevator

during its passage up the main elevator, as evidence the combination of such a swinging elevator with the main elevator in the position shown in the patent was not a practically operating device, or do you think a different rule should be applied to the Olin patent than that which you apply to the Elward?

A. No, I do not think it would be evidence that it was not practical simply because it was placed in different position or location, for the reason that I do not regard it as material what position or location the device occupies so long as it attains the object for which it was constructed.

X Q. 184. Then I understand you that if Elward transferred his deflecting butter-apron from the lower platform of the harvester to the binder table and used it in the latter place to deflect the butts of the grain, you would consider that as evidence that it was impracticable in the first position but if Deering owing to the Olin patent which specifically describes and claims a butt-elevator pivoted to the lower end of the harvester elevator, and having its upper end swing, forming a means for elevating the butts of the grain: never used the Olin device as there shown and described but took license under the Appleby and Bullock patent for
287 a swinging butter placed on the binder deck, and deflecting the grain in its downward path after its discharge from the elevator, and only built in accordance with this last-named patent, you would not consider that fact as indicating that the construction shown in the Olin patent was found to be impracticable. You also would consider the fact that from the time the Olin patent was applied for in 1877 to the present day none of the elevated or Marsh harvesters, put upon the market by anybody, have adopted the Olin construction, while all of them have adopted the Appleby and Bullock as having no significance as to the practical operativeness, or efficiency of the Olin construction as distinguished from the Appleby and Bullock, would you?

A. No, I would not, for the reason that the distinctions made and embodied in your question for comparisons are simply distinctions without a difference. First, it would make no difference what position you placed this Elward belt as embodied and described — patent referred to, it would still be inoperative in that it lacks the elements as I have described in my previous evidence in this case, to make it a practical adjusting device. Second, that it makes no difference what position the Olin device may be placed in relation to the flow of the grain whether as Appleby and Bullock use it, or as used in the Olin patent it would still be operative as an adjuster to deflect the flow of the grain.

X Q. 185. You think do you, that the fact that no manufacturer has adopted the Olin construction and that all the manufacturers of these machines, including the complainant, the owner of the Olin patent, have adopted the Appleby and Bullock construction as embraced in the patent of 1882, does not tend to show that the manufacturers and users have found the difference between the two constructions to be material, in other words a distinction with a difference?

A. No, I do not think so, for the reason that I believe the Appleby and Bullock construction, as I have before stated, embodies within it, the Olin invention, above referred to.

X Q. 186. The complainant and others were building harvesters employing an elevator similar to the main harvester elevator of the Olin patent intermediate between the time when the
288 & 289 Olin patent was applied for and the time when the Appleby and Bullock butter on the binding table came into use, were they?

A. Yes.

X Q. 187. And these machines, built during this period, had no deflecting butter, on either side the elevator or the binding table had they? I refer to the machines built by complainant, between the date of the application of the Olin patent and the date when the complainant begun to build in accordance with the Appleby and Bullock patent, that is, with the arrangement of butter on the binding table shown in the last-named patent?

A. I cannot say, of my own knowledge, whether they did or did not, or if they did, how many were built.

X Q. 188. You were familiar with the Deering machine during that period, and so far as you know they did not contain any deflecting butter either as an elevator or as a guide on the binder table, is not this true?

A. Yes, I was familiar with the machines that they were putting upon the market during this period, and I do not know that they put any machines on the market, during this period which you refer to containing such adjusting devices, as you refer to.

X Q. 189. You state that the butter-apron in the Elward patent, 165,316 has not a "revolving belt." The specification of that patent states that this apron G "may be given a positive movement by gears or belt and pulleys from any convenient driving shaft, the movement of the apron in either case serving to move backward the butts of the grain projecting over the finger bar." With this butter-apron shown in the drawing and this statement in the specification do you not think it would be within the intelligence of an ordinary mechanic to give a positive movement by gears from any convenient driving shaft to the spool around which this apron extends and if such motion was imparted to it, as thus described in the specification, would it not be a "revolving be-t," or apron?

A. Yes, it would, but in my answer referred, I stated that it was not a revolving belt, for the reason that Elward in his patent states, first, that the belt may be revolved, by the butts of grain coming in contact with it. This, I know would not be a fact, and further that Elward, in his patent shows or suggests no arrangement,
290 by which it may be revolved by machinery, or by some moving part of the machine. He only suggests that there may be some arrangement provided for operating it.

X Q. 190. Then when you stated, unqualifiedly, that the Elward patent was not a revolving belt, you only meant that if the means of imparting positive movement to the belt mentioned in the specification was omitted, it would not revolve, did you?

A. I did, but I will say further, that I do not understand that any means are described for operating the belt and contained in this patent.

X Q. 191. Then, to you, as a mechanical expert, the statement in the specification, that this apron, may be given a positive movement by gears from any convenient driving shaft, would not convey an intelligible description of any means for imparting motion to the apron?

A. No, that is not what I mean; what I do mean is, that while the patentee suggests that means may be employed to impart positive motion, that such means are not described.

X Q. 192. The term gearing as a means for communicating power from one shaft to another, would not in your judgment, indicate a means for communicating that power, would it?

A. No, I think the word gear, or belt and pulleys from any convenient driving shaft would not describe the arrangement that might be necessary in this case to produce the positive motion mentioned, but if it should be decided that it was sufficient description of an arrangement for such purpose, the fact still remains that it is not shown in the specifications and drawings, either by diagrams or letters of reference.

X Q. 193. Then you adhere to the view that the description of this specification is not sufficiently intelligible to you as a mechanic to enable you, by the exercise of ordinary mechanical intelligence to construct the butter-apron and moving gear so that the apron will be positively driven by the gear as stated in the passage from the specifications as quoted, do you?

A. No, I think I could construct an arrangement of gearing belts, or pulleys that would impart motion to it.

X Q. 194. Would not any fairly skilled mechanic of this art at the date of this Elward patent understand from this language in the specification how to construct an operative butter-apron positively driven by gearing, and how to grade its speed as com-
291 pared with other traveling aprons in the same machine?

A. Yes. I think that a skilled mechanic would be able to construct such arrangement for operating the rollers, as would impart motion to it, but as to the degree of motion required and other arrangements that might be necessary for the successful operation of such a device for a butter would require one skilled in operating such machinery in the grain in actual use.

X Q. 195. Is not the application of the gearing as a means of communicating motion from one shaft to another one of the most familiar expedients in the construction of machinery and is not the relative speed of the parts between which the gearing communicates determined by exact mathematical compution?

A. Yes, I think this is a fact.

X Q. 196. If the butter-apron of the Elward patent were given a positive movement by gears as stated in the specification, would it not tend to move the butts of the grain in the direction in which it rotated?

A. Yes, if it moved with sufficient speed, but I want to explain

here that I have had much experience in perfecting a device for moving the grain, similarly situated as this, and to be driven by gear, and that after experimenting for a couple of years with the aid of the skilled mechanics which a harvesting manufactory usually employ, I finally arrived at a sufficient perfection of it to positively move the grain, in most conditions, and for this reason I have mentioned the difficulties attending the mode of construction and perfection of a device of this character, located or situated as shown in the Elward patent referred to.

X Q. 197. If the particular mode of applying the gearing to rotate the apron, and the particular shaft, from which the power should be derived, or the rate of speed relative to the harvester elevator at which the butt-elevator should rotate, remained to be ascertained, after the Elward patent, neither the defendants, nor the complainant, nor any other manufacturer has, so far as you know, ever adopted the Olin construction in respect to either of these three particulars, is not this so?

A. Yes, I think they have, in this, that in the Olin the diagrams and specifications show that the travel of the butter-belt shall be faster than the flow of the grain with which it engages, and this has been found necessary in constructing and operating butters of this description.

292 X Q. 198. I did not ask you whether the defendants, butter-apron moved faster or slower than the elevator. I want you to answer directly first:—as to whether the particular mode of applying the gearing to rotate the apron and the particular shaft from which the power is derived is the same as in the Olin patent; second:—whether the ratio of speed between the harvester elevator and the butt-apron on complainant's or defendants' binder belt is the same as the ratio between the speed of the harvester elevator and the butt-elevator of the Olin patent; and third:—whether either the defendants' or complainant's machine follow the construction of the Olin, in applying the power through the spool at the swinging end of the apron?

A. To the first part of your question my answer is yes, and to the second part I answer yes about the same, and to the third part of your question I answer yes; they apply the power the same; however, in the Olin power is applied to the swinging end, while in defendants' it is applied through the pivot end, or in other words, the defendants' construction is Olin's reversed, as shown in diagram, Complainant's Exhibit No. 6.

X Q. 199. Now, as I understand, your answer to each of the three parts of the last question to be radically incorrect. I will ask you particularly, first:—whether the mechanism for applying power to the belt in the Olin construction is not one containing a series of special devices adapted to be operated upon at different points along the driving shaft, while the defendants' construction has no such devices; second:—whether the shaft from which motion is communicated to the belt in the Olin construction is not the uppermost shaft, while in defendants' construction it is a shaft below the uppermost?

A. My answer to the first part of the question is yes; the Olin construction, whilst it contains the element of the defendants' construction does contain the additional feature that permits it to slide upon the shaft from which it receives its motion, and to the second part of the question I answer yes.

X Q. 200. Now, as you have said that the ratio of speed between the butt-elevator and the harvest elevator of the Olin machine is the same as the ratio of speed between the harvester elevator and the swinging butter on the binding table of defendants'
293 machine, please state exactly what rate and ratio of speed is in each case.

A. I have not been mathematically exact in my statements as you assert; I have said about the same and the ratio as shown in each machine, may be determined by measuring the size of the pulleys employed for driving, and the comparative sizes of the gear, so employed, and I have no means at hand, at present, for making the measurements necessary, but if you require it, I will obtain the necessary implements and make the measurements necessary, and give them in at any future time you may desire.

X Q. 202. Please do so as early as may be.

A. I will.

X Q. 203. I have asked you "whether either the defendants' or complainant's machine follow the construction of the Olin in applying the power through the spool at the swinging end of the apron," and you answered that question yes; I now ask you if it is not a fact that neither the defendants' nor the complainant's machine, nor any of the Marsh harvesters on the market apply "the power to the spools at the swinging end of the apron"?

A. Yes, and I will quote from my previous answer, to explain: "In the Olin patent power is applied to the swinging end, while in the defendants' it is applied to the pivoted end." And I will say further, that I understand you to mean when you say—spool—a pulley which drives the revolving belt and the harvesters you allude to in your question, I think, as a rule, follow the construction which I have described.

X Q. 204. You have repeated the method of your former answer in making two diametrically opposite statements, so that it still is obscure, whether by "yes" you mean yes, or no, is it not a fact that the Olin patent shows the power for driving the butt-elevator applied through the spool at the end which is free to swing inward instead of at the spool on the stationary pivot, and that the machine constructed by complainant and other manufacturers of Marsh harvesters have the power to drive the apron applied through the spool, at the pivot end of the apron; please answer yes, or no.

A. I did think I had my answer sufficiently clear for you to comprehend—the manner in which you state your question, I must admit that it may be possible that I do not comprehend it, but, if it will convey the necessary meaning to you intended by me in my explanation, I will answer your question, yes.

294 X Q. 205. What element of the defendants' machine do you

understand to correspond to the harvester elevator mentioned in the complainant's patent?

A. That part which carries the grain from the grain-receiving platform to the binder.

X Q. 206. Do you include in the term elevator, as applied to defendants' machine, anything more than the travelling apron which raises the grain from the platform to the point where it falls from the travelling apron?

A. Yes, I include all the elements employed in defendants' machine in conveying the grain from the platform to the binder, and I will explain further, the reason I include these elements is, first, that the binder is located on a plane higher than the grain-receiving platform, and that it is necessary to in some way elevate the grain to this higher plane, and whatever devices employed for the purpose of making this transfer, I include.

X Q. 207. You include then the packers and binder arms under the term harvester elevator?

A. Yes, I think the packer fingers form a part of this operation that I have alluded to.

X Q. 208. And when you said the relative rate of speed, between the mechanism of the harvester and the butter-apron, was the same in defendants' machine as that between the elevating mechanism and the butt-elevator of the Olin patent you meant to be understood as saying that the rate at which the arms of the person referred to in the Olin patent as binding by hand, moved, as compared with the motion of the butt-elevator, was the same as the ratio between the binding arm and packers of defendants' machine and the butter-canvas on this machine, did you?

A. No, I do not think you have understood me in my explanations regarding these various devices employed in elevating, or carrying grain from the harvester platform to the binder, I have endeavored to explain that it is an essential feature in an adjusting device, that properly move and adjust the grain with which it engages, that the motion of the adjuster belt should be at a higher speed than the flow of the grain with which it comes in contact, wherever such an adjuster or butter may be located relatively with the receiving platform and the binder platform.

Adjourned till December 26, 1887, at 10 o'clock a. m.

295 DECEMBER 26, 1887.

Said parties met pursuant to adjournment.

Present as before for complainant, and Joseph G. Parkinson for defendants.

X Q. 209. Have you made the measurements called for by cross-question 202, and if so, will you now answer cross-question 200?

A. I have made such calculation, and from my calculation, whilst I do not profess to be mathematically exact, I will say that the speed of the adjuster relative to the movements of the elevator, or grain-carrying device, or in other words, relative to the flow of the

grain with which it engages, that the adjuster belt travels, not less than 25 per cent. faster.

X Q. 210. Do not nearly all low-down binders have an incline at the delivery end of the platform, up which the grain is forced, either preparatory to being bound, or while it is being packed or bound?

A. Yes, I think so.

X Q. 211. What is the purpose of that upward incline?

A. It is the receptacle for the bundle, as it is being bound.

X Q. 212. What is the object in giving it an ascending incline?

A. The feature of the ascending incline is necessary because the binder is so placed as to bind the grain on the incline instead of a decline and thus showing in such instances that the operation of binding occurs, and is practical either on an incline, or on a decline; as shown in defendants' machine.

X Q. 213. Is this operation of binding practicable, when the whole platform, carrier and binding table are on a dead level that is, do you know of any successful machine of that type?

A. I have operated such binding machines to considerable extent, as you refer to, but I believe, that some elevation to accommodate the parts necessary to constitute a binder to be preferable.

X Q. 214. Is it not a fact that an elevator more or less pronounced in height is regarded as essential in modern machines, in order to properly straighten the grain as it comes from the platform carrier?

A. I think it is.

X Q. 214½. The elevator in a low-down machine does not as a rule bridge the main wheel does it, and is not for that purpose?

A. I think it does not in all cases, however in what is known as the Buckeye down binder, the main wheel is bridged.

296 X Q. 215. In your answer to cross-question 213 you say that you have operated a binder in which the grain traveled on a dead level from the divider end to the discharge, that is, one in which there was no elevator or upward incline. I would like to have you state whether the employment of a butt-adjusting belt, in such a machine would come within the terms of the Olin patent and if so give your reasons, referring to the claims of that patent.

A. When using a butt-adjuster on such a machine, the adjuster would be placed on a line with the flow of the grain the same as in all cases that I know of where such butt-adjuster is made use of.

X Q. 216. You have not answered my question and I will have it read to you again and request that you will answer it categorically.

A. I think it would come within the terms of the Olin patent. If it were a revolving swinging belt operating to engage the butts of the grain for adjusting the same to the binder that the grain may be bound centrally with its length as described by Olin in his specification and claims for such a device.

X Q. 217. Then, in such a horizontal machine you would find the combination of a main elevator, and a swinging elevator as in Olin's first, second, third and sixth claims would you?

A. So far as the claims which you have mentioned are concerned, the main elevator, as referred to would be absent in the machines I have described.

X Q. 218. Then, would, or would not such a machine be within the terms of these claims?

A. I think that would depend upon a definition as to the functions or uses that the main elevator alluded to, or the offices and duties performed in cutting and binding grain for which such elevator may be used. I am aware that in the claims alluded to the main elevator forms an element, and whether Olin in his patent would be strictly confined to this elevator or not, I think would be a question, for in his patent I find that he states that other kinds of elevators may be used in connection with his device for adjusting the grain.

X Q. 219. I am looking to you as a mechanical expert for such a definition as is necessary to determine whether or not the horizontal machine we are talking about would come within the terms of these claims; can't you give it?

A. In my opinion, I think it would.

297 X Q. 220. State your reasons for the faith that is in you?

A. I think my reasons, given in my last several answers are sufficient for my situation, if they are not, I am willing to abide the consequences.

X Q. 221. Then you do not regard the terms "main elevator" as used in the claims I have named, a material limitation, do you?

A. No, I do not, for the reason I have stated before, that I think the patent is not limited, to the kind described.

X Q. 222. Is not limited to any elevator at all, is it?

A. Yes, I think it is.

X Q. 223. Where would you find that elevator in the horizontal machine?

A. If the term elevator, as applied to moving grain from a grain-receiving platform to a binder, should be held to mean a lifting process then it would not be found in a horizontal machine; but, if it would mean the carrying of the grain from the grain-receiving platform to a binder in whatever position the binder may be located as regards the grain-receiving platform, the horizontal machine would contain the feature. It is not an uncommon expression for farmers to use who operate machines like defendants' to term this revolving butter which is located on the decline the "little elevator."

X Q. 224. In what sense was the word "elevator" used in harvesters in the years 1877–1880; that is, what idea did it convey to you and others skilled in the art during those years?

A. As pertaining to harvesting machines the word was used to designate machines that carried the grain to binders either automatic or manual.

X Q. 225. What part of the machine was the term applied to?

A. That part which carried the grain from the grain-receiving platform to such binders as I have referred to.

X Q. 226. Describe the harvester elevator, its relation to the plat-

form carrier and binding table and its construction as it was understood in the years I have just named.

A. During the years referred to there were many different kinds, of elevators, differing in their construction and arrangement, but the main class of machines, as in use during those years were constructed in the following manner: First, a grain-receiving platform in a horizontal position and an elevator or carrier device re-
298 ceiving the grain from the grain-receiving platform, and depositing the grain in an automatic binder or to a table for men to bind by hand. Those elevators or carriers usually consisted of revolving belts engaging the grain, and in some cases reciprocating teeth or fingers engaging the grain to so place it to the binders.

X Q. 227. Did the elevator or carrier to which you refer lift the grain above the level of the grain-receiving platform or did it not?

A. It did.

X Q. 228. If the term "elevator" had been used in your presence in reference to a feature of a harvesting machine during the years 1877 to 1880 inclusive, would or would you not have understood it to refer to a device to lift the grain above the level of the grain-receiving platform?

A. I would.

X Q. 229. Did you ever during those years know it to be applied to a device that did not actually elevate the grain?

A. No, I don't think, I did.

X Q. 230. In your answer to question 223, do you mean that farmers term the butt-apron on the grain chute as in the McCormick machine "the little elevator" or do you refer to low-down machines like the Buckeye?

A. Yes, I mean as used on the McCormick machine and others of its class.

X Q. 231. Did you ever know a butt-apron in a machine like the McCormick or the Winona, to be termed a "little elevator" by manufacturers and skilled mechanics in the art?

A. Not as a rule.

X Q. 232. Did you ever know it as a rule or an exception to be so termed by manufacturers or skilled mechanics engaged in the manufacture of harvesters?

A. I think, I have heard it used in this way by some operatives of such manufacturers.

X Q. 233. Are you sure that you have heard it used in this way by any one skilled in the art of manufacturing harvesters?

A. I think, to some extent they would be called skilled as they were sufficiently skilled to adjust and operate such machines.

X Q. 234. I do not ask your opinion of their skill but whether you are positive that you have heard any one whom you would consider*ed* skilled in the art apply the term "little elevator" to the butt-apron as it is shown in the McCormick or Winona machine?

299 A. Yes, skilled in the art, at least to some extent, or to the extent my previous answer implied.

X Q. 235. What is the reason that the butts of the grain lag be-

hind the heads as the stalks are carried up the harvester elevator?

A. Usually the grain is turned head first by the butts catching, or comming in contact with the standing grain, as the machine advances in the field, before the grain reaches that part of the machine termed the elevator.

X Q. 236. Then the statement in Olin's specification, that it is on account of their greater weight, is incorrect, is it?

A. Not necessarily, for in some cases it may be a fact.

X Q. 237. The greater speed of the butt-elevator over the main elevator, in Olin's prtent, is to enable the butts to catch up with the heads, is it not?

A. I think it is.

X Q. 238. In the McCormick machine what mechanism corresponds in the main elevator in Olin's patent?

A. That part which carries the grain from the receiving platform to the binder.

X Q. 239. Name that part.

A. The grain-carrying elevator.

X Q. 240. Is the grain-carrying elevator in the McCormick machine, an endless apron extending from the platform to a ridge over the main wheel?

A. Yes, I think it forms a ridge over the main wheel, and extends from the grain-receiving platform.

X Q. 241. Does it extend down on the other side of the ridge?

A. So far as the aprons are concerned, they do not, but they have accessories that work in unison with them, which extend down the other side.

X Q. 242. Do you mean that the packers are part of the main elevator?

A. Yes, so far as they work in unison with the elevator and are a part of the same in conveying the grain from the main receiving platform to the place where it is bound.

X Q. 243. Which moves fastest in the McCormick machine, the packers or the surface of the butter-apron?

A. I think the point of the fingers of the packers move with greater speed than the surface of the butter-apron, but the packers referred to not engaging the butter of the grain with which the butter comes in contact, they do not move the butts of the grain with the same speed that the surface of the butter-apron moves.

300 X Q. 244. How is it as to such parts of the packer fingers as rise above the surface of the decking, do they move any slower than the butter-apron?

A. The part of the packer fingers which rise above the surface of what you term decking, are the parts of the packer fingers referred in my last answer.

X Q. 245. Then in the McCormick machine the surface of the butter-apron does not move so fast, or any faster than that part of the elevator, as you term it, along which it is placed while in the Olin patent the surface of the butt-elevator must move faster than the main elevator. Is this not correct?

A. Yes, but I want to be understood, in accordance with my previous description, that in either case alluded to in your question, the butter-apron moves faster than the grain with which it comes in contact.

X Q. 246. You mean it moves faster than the half inch of the butts of the grain with which it comes in contact would do if engaged by it, but not faster than the waist of the gavel is urged forward by the packers.

A. No; what I mean is that the butter moves faster than the grain with which it comes in contact on its passage to the bundle receptacle, and to make my explanation clearer, I will refer to sketch 9, showing the advancing action of the adjuster-canvas in the defendants' machine.

X Q. 247. Who prepared the sketches which you have introduced in evidence?

A. Some of them were prepared from my instructions and suggestions but there are some of them that were prepared without my suggestion, however, they were all submitted to me before they were introduced and received my approval. I believe them to have been prepared by draftsman in the employ of Mr. Wm. Deering.

X Q. 248. State which ones were prepared from your instructions and suggestions and who prepared the others.

A. I suggested that such diagrams be prepared as are contained, I think in all of these that I have shown.

X Q. 249. Did you suggest the diagrams themselves or simply that diagrams should be prepared, and to whom did you make the suggestion?

A. The suggestions made by me were to Mr. Jno. F. Steward and my instructions were that the draftsman should prepare such sketches as would be necessary in showing the various operations in the handling of the grain, and I made some marks and
301 diagrams illustrating my ideas which I wanted embodied in the sketches by the draftsman.

X Q. 250. Are you quite sure that all of the sketches and diagrams originated with you?

A. I am, in all essential features which they contain.

X Q. 251. In what condition does the grain reach and travel up the harvester elevator with regard to being matted or interwoven? By elevator, I mean, an ascending elevator, not your lately discovered descending elevator.

A. Sometimes it comes headforemost, and sometimes the reverse, and sometimes both ways at once; however, in the majority of cases the grain will reach the elevator in advance of the butts of either an ascending elevator or on the descent.

Adjourned till December 27, 1887, at 10 o'clock a. m.

DECEMBER 27, 1887.

Met pursuant to adjournment.

Present as before for complainant, and J. G. Parkinson, Esq., and P. C. Dyrenforth, Esq., for defendants.

X Q. 252. Do you mean by your last answer that the grain will reach the elevator matted or interwoven or not?

A. Yes, that would be the case in some instances.

X Q. 253. Would it go up the elevator in that condition?

A. Yes, it would go up the elevator in a similar condition.

X Q. 254. In the McCormick machine what apparatus corresponds in relative arrangement and function to the butter-apron with the tooth belts M in the Olin patent?

A. That part which carries that grain from the receiving platform to the receiving table.

X Q. 255. Please give a more definite answer. I asked for that apparatus which corresponded in its relative arrangement to the butter-elevator, or butt-apron with the tooth belts M, shown in the Olin patent, and I wish you to give a physical description of that apparatus in the McCormick machine.

A. I understand now that you refer to the revolving belt of the Olin patent, which engages with the butts of the grain in its flow to the binder, and operates as a swinging adjuster for the same. In the McCormick machine that part which performs these functions is the revolving belt or apron, situated on the receiving
302 table. In the McCormick machine the grain is received from the main grain-receiving platform by an endless apron or belt and carried on its course to the binder to a receiving platform where the revolving butter is situated. In the Olin patent the grain is received by a series of revolving belts, and is carried to the receiving platform, but unlike the McCormick, the adjusting belt is situated between the grain-receiving platform and the receiving platform above alluded to. I think these are the corresponding parts to which you alluded in your question.

X Q. 256. I did not ask for corresponding parts, as you term them, but for that part which in its arrangement relatively to the butt-adjusting belt is the same as the belts M in the Olin patent.

A. The parts which carry the grain from the grain-receiving platform to the place where it is bound I understand to be the relative parts, and in the McCormick machine this consists, as I have before described, of a revolving belt or apron. Of course, in the McCormick machine alluded to the packer teeth are a part of the carrying device which carries the grain from the receiving platform to the binder, but in the Olin patent no packer teeth are shown; neither is a binder shown.

X Q. 257. Do you intend to say that the relative arrangement of the canvas apron on the ascending side of the elevator and of the butter-apron on the grain chute in the McCormick machine is the same as the relative arrangement of the butt-elevator Q and the belts M in the Olin patent?

A. The relative arrangement is not the same as in your question.

X Q. 258. Well, then, what is there in the McCormick machine that corresponds in relative arrangement to the butter-apron with the relative arrangement in the belts M and the butter-elevator Q in the Olin patent?

A. The relative arrangement of the various devices you have mentioned for carrying the grain in the McCormick machine would be that part which carries the grain on the grain-receiving or binder platform, and the comparative arrangement would be the packer teeth as working in unison with the belt-adjuster to move the grain to the bundle receptacle.

X Q. 259. In the McCormick machine does the longitudinal adjustment of the grain take place while it is in the grasp of the packer teeth?

303 A. Not wholly, but more or less as shown in sketch 9 of sketches introduced in this case showing the advancing action of the adjuster canvas in defendants' machine.

X Q. 260. Do you mean to say that the course of the adjuster belt or apron is sufficient to slip the stalks endwise along the packer teeth after they have once been grasped by them?

A. Yes, the packer teeth alluded to being alternating in their movement, or in other word, grasping a wisp of grain, and then letting go to get another wisp, sufficient relaxation is made thereby to move the grain more or less laterally, as the case may require.

X Q. 261. That is because the packers alternately grasp and release the wisps, is it? And the adjustment takes place in the intervals when the wisps are released?

A. Yes, the adjustment takes place whilst the grain is so being carried to the gavel receptacle.

X Q. 262. If there was no intermittent release of the wisps would the butter-apron give any lengthwise movement to the stalks while they were being acted upon by the packers, so as to result in a bodily adjustment of the gavel?

A. I think the grain could be held sufficiently tight to prevent its being moved by the butter-belt laterally, but in this case it is not: the presser on the grain in amount is only just what is necessary to move it, and this would not be sufficient to prevent its being moved laterally as I have described. Abundant evidence of this fact is shown in the operations of what is known as the Buckeye down binder, an illustration of which may be seen in Defendants' Exhibit Cut of Buckeye Down Binder.

X Q. 263. Supposing a machine to be constructed precisely as shown in the first and second figures of Olin's drawing—that is, with three elevator belts M, having teeth $X^6$ and with a butt-elevator apron Q and with a spring pressed flat R holding the grain down upon the tooth belts M and that the grain as it was carried up the elevator, was engaged by the teeth of the three belts, and was in the usual average condition of grain as it is carried up a harvester elevator, do you say that an endwise adjustment of the stalks of grain by means of the butt-elevator apron Q would be possible while it was going up the elevator and held down on the tooth belts M by the float or presser R, pressed down as it is by springs.

304 A. Yes, I think it would, for in this arrangement the only friction necessary to overcome in making an endwise adjustment of the grain would be the weight of the grain itself, as it is

being carried forward by the teeth. The board R referred to adding little or no friction to the movement of the grain, its functions being to prevent the grain from being blown away by the action of the wind or rising too high for the engagement of the adjuster apron.

X Q. 264. Did you ever see, or know of a practical working machine constructed precisely as shown in the first and second figure of Olin's drawing, that is, a machine in which the grain was adjusted endwise by belt Q while being elevated by tooth belts M precisely arranged and proportioned as in Olin's drawings?

A. No, if you mean by "precisely" the exact duplicate, I have not, but if you mean practically the same, I have.

X Q. 265. Please describe the machine that you think was practically the same as Olin's, that is, the same as the machine shown in the first and second figures in Olin's drawings.

A. I think, nearly all modern binding machines contain practically these elements, but I will refer to the machine known as the Buckeye down binder, represented in cut, Defendants' Exhibit Buckeye Down Binder, as showing more nearly the arrangement of Olin, in that the grain is carried, by teeth being supported by a table more nearly as in Olin.

X Q. 266. Do you know of a single modern binder, or did you ever know of any binder or harvester successfully operated in the field where the teeth of either an elevator, conveyor, or packer were constantly in engagement with the stalks of the grain along their length, during the entire time that the butt-adjusting apron was acting upon their ends?

A. I think not; the binder above referred to would be nearest to your description of any that I now think of.

Cross-examination by Mr. DYRENFORTH:

X Q. 267. Are you fully familiar with the Bullock and Appleby patent which has been referred to in the course of your present examination?

A. I can't say that I am fully familiar, but I believe that I am familiar with it in a general way.

305 X Q. 268. The patent to which you refer is No. 266,949, dated October 21, 1882, is it not?

A. It is.

X Q. 269. What you had before you in making your last answer but one, was the cut and copy of claims of the Bullock and Appleby patent, as given in the Official Gazette of October 31, 1882, was it not?

A. Yes, it is.

X Q. 270. I now show you a complete copy of the Bullock and Appleby patent referred to, and request that you will examine it carefully, in order that you may famil-arize yourself with it fully. When you have done so please announce the fact on the record.

A. I have examined the patent referred to and believe that I am familiar with the contents thereof.

X Q. 271. How does the construction as to the butt-adjuster in the defendants' machine compare with the construction shown, described and claimed in the Bullock and Appleby patent?

A. So far as the arrangement of the pulleys and the revolving belt that is driven thereby, I regard it as the same. But the location as shown in the diagram and the manner in which it receives its motion are different.

X Q. 272. To make the matter clear please explain your last answer, in so far as it relates to a difference of location between the defendants' butt-adjuster and the butt-adjuster in the Bullock and Appleby patent.

A. In defendants' machine the butt-adjuster pivot point is directly over the centre of the elevator roller, and is held in place by a frame and driven by a bevelled gear from said roller. In the Bullock-Appleby arrangement the pivot point of the adjuster is somewhat removed from the elevator roller, and is driven by pulleys with a belt leading from the elevator roller for that purpose. While this may not be all the differences, I think it to be the main points of difference.

X Q. 273. Thus the butt-adjuster, as represented in the Bullock-Appleby patent is on the binder side of the machine, as in the defendants' machine, and is operated in the same manner for the same purpose, though the driving mechanism differs somewhat, and the butt-adjuster in the Bullock and Appleby patent instead of being close to the upper end of the main elevator, as in the defendants' machine, is removed some inches from it. Does that state
306 the matter correctly according to your understanding?

A. I think it does.

X Q. 274. Would a machine with a butt-adjuster constructed in all respects in accordance with the Bullock and Appleby patent referred to, be included within the terms of the claims of the Olin patent, in your opinion?

A. Yes, I think it would, in so far at least, as the revolving belt engages the butts of the grain to deliver the grain in a proper manner to be bound.

X Q. 275. Do you find by reference to the Bullock and Appleby patent that the patentees were granted broad claims to the location of the swinging butt-adjuster of this nature in the position shown and described in the patent, that is to say, over the receiving table and beyond the elevator?

A. Yes, if I understand your question, as I believe that the claims limit them to a matter of specific location.

X Q. 276. Suppose that the Bullock and Appleby patent had antedated the Olin patent, in that case would the device, represented in the Olin patent, constructed as there shown, be an infringement of the claims of the Bullock and Appleby patent, in your opinion?

A. In view of the claims to Appleby and Bullock, it might be construed as an infringement, but in case the Bullock, as you say had antedated the Olin patent referred to, I think they would have been entitled to broader claims than they obtained.

X Q. 277. Do you find the terms of the Bullock and Appleby claims to be any more specific than the terms of the Olin claim?

A. Yes, I think they are.

X Q. 278. Please explain fully, in what particulars, and give your reasons why the Bullock and Appleby claims, might not just as well be construed to mean the Olin device as the Olin claim to cover the Bullock and Appleby device.

A. In the Olin patent, the combination is with a harvester elevator, and not with a specific elevator, whilst in the Bullock and Appleby it is in combination with the receiving table. In the Olin patent is included also devices for shifting the adjuster, which I do not find in the Bullock and Appleby. In those comparisons I find the Bullock and Appleby more limited than the Olin.

X Q. 279. Is not the Bullock and Appleby butt-adjuster capable of swinging adjustment, and are means for effecting such ad-
307 justment shown and described in the patent?

A. Yes, but I think that in view of the Olin patent these means for adjustment could not be claimed or held by the Bullock and Appleby.

X Q. 280. Do you find the Bullock and Appleby patent to be any more limited by the terms of its claims to location than the Olin patent?

A. Yes, I do.

X Q. 281. Then supposing the Bullock and Appleby patent had antedated the Olin patent, it is your opinion that the Bullock and Appleby claims as drawn, would not have included a butt-adjuster, located as is shown in the Olin patent, while on the other hand, the terms of the claims in the Olin patent do include the butt-adjuster, located as shown in the Bullock and Appleby patent—am I correct?

A. Yes, I think you are in the main correct, as I have explained before, I regard the claims, as claimed in the Bullock and Appleby patent, limited to a specific location and device, whilst in the Olin, I believe, that I am warranted in saying that his claims would be equally good, in combination with any kind of an elevator or grain-carrying device.

X Q. 282. Then why do you say, that I am only "in the main" correct, instead of that I am correct?

A. Because I think your words "as shown in the Appleby and Bullock patent" include some unimportant features that are not shown in the Olin.

X Q. 283. Suppose the Olin first claim, had read "in combination with the" instead of in combination with a harvester elevator, would it in that case have included a butt-adjuster constructed and located like that shown and described in the Bullock and Appleby patent?

A. In my opinion, it would indicate some limitations, but in view of Olin's specifications, stating that his device may be used on other kinds of elevators, I am not certain that it would make a difference.

X Q. 284. Do you consider claim one of the Olin patent broader

or narrower by including as an element suitable devices for shifting its upper end, than it would be if that element were omitted?

A. While the claim would be limited to means for making the adjustment, this being a necessary and essential feature to the practical operation of the adjuster, I can't say that it would be narrowed thereby.

308 X Q. 285. Suppose that the upper end of Olin's swinging butt-adjuster were secured at the desired points by means of pegs or pins entering holes in the backing board of the elevator belts, would that come within the terms of the Olin first claim?

A. If they were suitable devices for making the adjustment, I think they would.

X Q. 286. Are the modern slatted canvas elevators provided with a backing board, like the belt elevators provided with teeth such as is shown in the Olin patent?

A. No, not the same arrangement, but in many of them there is a board, but this board is for a different purpose, being used as a shield or guide for the apron.

X Q. 287. In a former part of your cross-examination you have referred to certain low-down binders of different manufacturers, which you say embody the Olin device in substantially the form shown and described in the Olin patent, as to relative location of parts, will you now please enumerate, as far as you can, the various manufacturers who embody a swinging and adjustable butt-adjuster in substantially the form, as to relative location of the parts that is shown, described and claimed in the Bullock and Appleby patents.

A. I think the Bullock and Appleby arrangement is used on the majority of the machines that are manufactured in the United States.

X Q. 288. For how many years has the Bullock and Appleby device been employed upon the majority of the harvesters manufactured in the United States?

A. I think this arrangement of the butt-adjuster, to which you allude, has been in use on the majority of harvesting machines for the last four or five years.

X Q. 289. Will you please enumerate, so far as your knowledge goes, the various manufacturers who have employed the Bullock and Appleby device during the past four or five years, at any time?

—. I think the Appleby-Bullock arrangement, as shown in the patent, with some modifications, is used, or has been more or less used by D. M. Osborne & Co., Aultman, Miller & Co., Champion Machine Co., Whitely, Fassler & Kelly, Wardner, Bushnell & Glessner, Johnston Harvester Co., Minneapolis harvester works, Winona harvester works, Milwaukee harvester works, George Es-

309 terly, the Plano Mfg. Co., the McCormick Harvesting Machine Co., Wm. Deering & Co., Hoover & Gamble, C. Aultman & Co., Sandwich Mfg. Co., Polo harvester works, Marsh Binder Mfg. Co., J. F. Sieberling & Co. There may be a few others that I cannot recall at the present time.

X Q. 290. Your list includes all of the most extensive manufacturers of harvesting machinery in the United States, does it not?

A. With the exception of Walter A. Wood Reaper and Mowing Machine Co., I think it includes all the harvester and binder manufacturers.

X Q. 291. Exclusive of Wm. Deering & Co., at what number would you estimate the aggregate annual output of harvesters and binders by all the manufacturers that you have named?

A. For the last few years, I should say, from 80,000 to 100,000 machines yearly.

By Mr. BANNING: As counsel for defendants have made frequent reference in their cross-examination of this witness to the Bullock and Appleby patent of October 21, 1882, No. 266,949, I now suggest and request that they offer such patent in evidence?

By Mr. DYRENFORTH: In asking the questions that I asked the present witness concerning the Bullock and Appleby patent, I was under the impression that that patent had already been offered in evidence. If it has not, I am obliged to counsel for complainant for calling my attention to the fact, and I hereby offer in evidence, and request that it be marked Defendants' Exhibit Bullock and Appleby Patent.

Redirect examination by Mr. BANNING:

R. D. Q. 291. You have frequently referred to the Buckeye machine as a "down" machine, and the defendants' counsel seem to consider it as a low-down or platform binder. Is not the grain elevated over the wheel in this machine?

A. It is.

R. D. Q. 292. Does Elward make any suggestions in his patent No. 165,316, that would aid a mechanic in making his canvas adjustable at either end; say in a way similar to Olin's?

A. I find no such suggestion in the patent.

R. D. Q. 293. In your cross-examination you have been asked about the relative speed of the packer and butter-canvas, and
310 have answered in a general way. Please make as exact measurement and calculations as you can as to this, and then answer specifically.

A. After making the examinations as requested, I find that the relative movement of the packers alluded to in comparison with the surface of the butter-belt, that the packers travel about 18 inches, whilst the surface of the butter-belt is travelling about 26 inches in the same space of time. These calculations I have made by counting the relative revolutions of the wheels and the distance moved at such revolutions by each of the devices alluded to.

R. D. Q. 294. You have been asked in cross-examination to enumerate the different manufacturers of self-binding harvesters, and to estimate the number of Appleby machines, so called, which they have manufactured. Referring again to this general subject, please state who was the pioneer in this class of machinery, and who is now understood to be the largest manufacturers of self-binding har-

vesters? In answering this question, you may give such history of the art, so far as regards the general subject, here under consideration, as you consider proper.

Question objected to by counsel for defendants, as not proper redirect examination, and as evidently intended to make the United States court an advertising medium, whether truly or falsely.

A. In relation to the harvester and binding machine as manufactured and introduced on the market for the last eight years, I will say that I consider Wm. Deering as the pioneer in perfecting and putting upon the market the class of machines referred to. So far as numbers of these machines are concerned, I believe that he manufactures more than any other factory in the United States. The evidence I have for making this statement, is not from any actual records, but from my observation and knowledge, obtained in a general sort of a way.

311 Depositions taken on the part of the complainant at the office of Banning & Banning & Payson, room 527 to 530, 225 Dearborn street, Chicago, Illinois, by agreement of parties, this 21st day of May, 1888, before George S. Payson, a notary public in and for Cook county, Illinois.

Present: Thomas A. Banning, Esquire, of counsel for complainant and P. C. Dyrenforth of counsel for defendants.

L. C. BARTLEY, a witness produced, sworn and examined on the part of the complainant in answers to questions by Mr. BANNING deposes and testifies as follows:

312 Q. 1. State your name, age, residence and occupation.

A. My name is L. C. Bartley; forty-six; Englewood, Ill. I am a member of the firm of Robert Larkins & Co., hard-wood lumber dealers.

Q. 2. Were you ever in the employ of D. S. Morgan & Co., of Rockwood, N. Y., in any capacity?

A. I was.

Q. 3. What was the business of D. S. Morgan & Company?

A. They were engaged in the manufacture of harvesting machinery.

Q. 4. Under what particular name or names were their machines known and sold?

A. Up till 1875–'76 their reapers went by the name of "The New Yorker," since that date their machines have been known by the name of "The Triumph."

Q. 5. What was your particular line of duties or business while connected, or employed by D. S. Morgan & Company?

A. From May, 1868, until April, 1874, I was employed in different capacities. After April 1, 1874, I had general charge of the sale of their machines and all of the business connected with their Chicago office until Jan. 1, 1888.

Q. 6. While in charge of the sale of their machines as you have

explained you may state whether or not you became acquainted with the structure, in a general way, of their "Triumph" reapers?

A. I was thoroughly acquainted with their machine and all its parts.

Q. 7. Look at this piece of sheet iron, rivetted to a piece of bar iron, marked "Defendants' Exhibit Butt-adjuster with Adjustable Extension, Part Two" and state whether or not the Triumph machine contained any part out of which this piece before you may have been cut?

(Objected to as leading.)

A. That was cut from an exact duplicate of a piece that was attached to the outside divider of the Triumph reaper, and was called sheet-iron piece for divider

Q. 8. That is, the sheet-iron divider that was used on the Triumph machine was a duplicate of the piece from which the exhibit before you was cut, as I understand it?

(Objected to as leading.)

A. I should say so.

313 Q. 9. Of course you did not see this exhibit before you, cut out, but I will ask you to state your opinion and belief as to what it was cut from.

A. I believe it was cut from the sheet-iron piece which formed the outside divider of the Triumph reaper.

Cross-examination by Mr. Dyrenforth, waived.

L. C. BARTLEY.

Adjourned till Wednesday, May 23rd, 1888, at 10 o'clock a. m.

MAY 23RD, 1888—10 o'clock a. m.

Parties met pursuant to adjournment.

Present, as before.

WILLIAM A. KIRBY, a witness produced, sworn and examined on the part of the complainant, in answers to questions by Mr. BANNING, deposes and testifies as follows:

Q. 1. What is your name, age, residence and occupation?

A. William A. Kirby; age, 70 the 17th of last September; residence, Auburn, N. Y.; occupation, inventor.

Q. 2. What particular line of invention have you been mostly engaged in?

A. Mostly in reapers and mowers—harvesting machinery.

Q. 3. Are you the inventor of what has been and is known all over the country as the Kirby reaper or harvester?

A. I am.

Q. 4. Have you been connected with the manufacture of the Kirby reaper?

A. Only as an inventor and superintending the construction of it.

Q. 5. For how many years has this been?

A. Since 1855.

Q. 6. Has there been any other machine known throughout the country as the Kirby reaper except the one with which you have been connected and with which you have been acquainted?

A. There isn't any that I know of.

Q. 7. The machine which has been known as the Kirby reaper was a self-raking machine, was it not?

A. It was during the last few years.

314 Q. 8. Look at this piece of sheet iron rivetted to a piece of bar iron before you, marked "Defendants' Exhibit Heller Butt-adjuster, with Adjustable Extension, Part 2" and state whether there was used in the manufacture of the Kirby machine any sheet iron from which the exhibit before you could have been made?

A. We never put anything of that kind on at our shop.

Q. 9. Then the sheet iron used in this exhibit could never have formed a part of the Kirby machine as you manfactured them and as you know them?

A. No.

Q. 10. I believe you have already said that the only Kirby machine that you ever knew anything about was the one which was made at the works at Auburn, with which you were connected?

A. There were machines made at an early date in Indiana and Buffalo which had no sheet iron.

Q. 11. They were machines manufactured under your patent?

A. They were.

Cross-examination by Mr. DYRENFORTH:

X Q. 12. What do you mean in your last answer by "early date"?

A. I mean when we first commenced to make the machines.

X Q. 13. When was that?

A. In 1856. There was one built in 1855, but that was an experiment.

X Q. 14. And in those very early machines there was no sheet iron, is that correct?

A. There was no sheet iron.

X Q. 15. But on the later machines there was sheet iron, was there not?

A. There was.

X Q. 16. When did you begin to put sheet iron on the Kirby machines; about what year?

A. I couldn't tell that, it was certainly a number of years.

X Q. 17. As early as 1860?

A. As nearly as I can tell it was about 1860, or '61, but that is only a guess. Possibly as late as 1865.

X Q. 18. And from that time on you continued to use sheet iron on your machines, did you?

A. Yes.

X Q. 19. What was the nature of the sheet iron that was used on the Kirby machines?

A. The nature of the iron was common sheet iron.

315 & 316 X Q. 20. Like the sheet iron of this exhibit before you marked "Defendants' Exhibit Heller Butt-adjuster, with Adjustable Extension, part 2"?

A. Not like it, although it was sheet iron as this is.

X Q. 21. What was the difference in the sheet iron itself; understand that I am referring entirely to the material?

A. I couldn't see any difference in the material that it was made of.

X Q. 22. Was it painted?

A. Most of them were painted black, and some of them not painted at all.

X Q. 23. For what purpose was the sheet iron used on the Kirby machine, concerning which you have been testifying?

A. For the purpose of covering the front part of the platform where the grain falls.

Redirect examination by Mr. BANNING:

R. D. Q. 24. In answer to X Q. 21, you say, "I couldn't see any difference in the material that it was made of," what do you mean by that?

A. I mean the quality of the iron, not the thickness or anything but the iron that it was made of.

R. D. Q. 25. What difference was there, if any, in the thickness or heft of the sheet iron, which was used in the manufacture of the Kirby machine and in this piece of sheet iron before you?

A. The iron that we used was considerably thinner than this in the exhibit.

R. D. Q. 26. Did you ever use any of the thickness of the piece in this exhibit?

A. I never knew of any being used as thick as this.

R. D. Q. 27. Was the sheet iron used in the Kirby machine ever painted on both sides as this piece is?

A. It was not.

R. D. Q. 28. Was it ever painted of a color any way similar to the piece before you?

A. It was not.

WM. A. KIRBY.

317 CHARLES WHITNEY, a witness produced, sworn and examined on the part of the complainant, in answer to questions by Mr. BANNING deposes and testifies as follows:

Q. 1. You have been examined in this case before, as a witness, I believe?

A. I have, as to certain matters.

Q. 2. Do you know Gottlieb Heller?

A. Yes.

Q. 3. I mean the Gottlieb Heller of Dickinson county, Kansas, who has been examined on the part of the defendant.

A. Yes, that is the Gottlieb Heller that I mean.

Q. 4. How long have you known him and how did you become acquainted with him?

A. I have known him since last March, and I became acquainted with him through my investigations in searching for evidence pertaining to the Heller butt-adjuster extension.

Q. 5. You mean the exhibit before you, marked "Defendants' Exhibit Heller Butt-adjuster, with Adjustable Extension, Parts 1 and 2" about which Heller and other witnesses testified for the defendants?

A. Yes, that is what I mean.

Q. 6. When did you make that investigation, and where?

A. My first investigations in this matter pertaining to the adjuster were commenced last year, but it was only in March, last, that I got acquainted with Mr. Heller; I met him at his house, first, near Dillon in Dickinson county, Kansas.

Q. 7. You may state fully about the investigation that you made in reference to the Heller butt-adjuster and what facts you ascertained and generally all that you learned bearing on the subject.

A. My investigation commenced, first by reading the depositions of Mr. Gottlieb Heller and others, regarding this butter-extension in controversy; noticing in the deposition given by Mr. Heller that in answer to Q. 8 on page 152 he states "I made it out of sheet iron and heavy hoop iron," having the exhibit before me at the time I was somewhat surprised at such evidence, from the fact that the exhibit appeared to me as a piece of sheet iron rivetted to a piece of strap iron and taken bodily and together from some machine, it being painted and striped and otherwise ornamented after
318 having been rivetted to the strap iron, as it appears from the paint upon it and from the fact that this exhibit also shows that a part of it had been roughly or temporarily cut with a cold-chisel whilst other parts were cut with shears. These facts indicated to me that the piece had been taken bodily and cut and shaped for some purpose, in fact, to conform to the shape of the deck of the binder upon which it was used. I made further examinations in the evidence pertaining to this device to endeavor to trace it to its origin, or to the machine from which the piece might have been taken, and in reading the defendants' record further, I found in answer to question 14, 15, and 16, page 193, the deposition of Geo. Heller, a statement to the effect that he knew and recognized the Exhibit Heller Butter-extension, and says, "because it came off our old Kirby self-rake." Being somewhat familiar with the machine known as the Kirby self-rake. I visited the warehouse of D. M. Osborne & Company, in this city, the sole manufacturer of the Kirby self-rake and was assisted by employés of that house in making search for such a piece. Failing to find anything corresponding to this identical butter-extension exhibit, and finding nothing pertaining to the old Kirby reaper, from which such a piece corresponding to this exhibit could have been made; I was then impressed with the fact that it must have come from some other machine. Noting further in reading defendants' record that the piece had been positively recognized and identified as the one made

and used by Gottlieb Heller, by not only his son, George Heller, but also by his wife Rosina Heller, I inferred that this exhibit must certainly have been the one made and used as stated in their evidence. In answer to Q. 15, page 518, Mr. Gottlieb Heller, stated he took it from an old self-rake machine, and in answer to X Q. 53, page 159, he also stated that he had had no experience with harvesting machines before the year 1878, except that he had a self-rake before. Thinking that there might have been some mistake as to the self-rake referred to, as the Kirby in George Heller's evidence, or some mistake as to the identical piece, I visited his place in Kansas last March for the purpose of further investigations, carrying with me the Exhibit "Heller Butt-adjuster, with Adjustable Extension, Parts 1 and 2." Some time during the latter part of March I called upon Mr. Gottlieb Heller at his residence and put various questions to him regarding the making of the but-
319 ter-extension and what he made it from and when he made it, and he did not hesitate in telling me that he made it from his old Kirby machine. He said from the sheet iron that was on his old Kirby self-rake platform. Showing him the extension and asking him to explain how he made it, he said I cut the sheet iron out and then made the strap iron, punching the holes both in the strap iron and the sheet iron, and rivetted them together. I then asked him to show me the platform of this old Kirby; he told me in answer, that it was destroyed, some pieces of the boards only remaining, but that other parts of the machine were there, such as the rake head, some pieces of the reel, and the mower part of the machine was on his son's farm. I recognized the rake head as the one known as the Burdick rake. This I know to have been the rake used upon the Kirby, as it was manufactured about the years 1874, '75, and '76. The machine as it was then constructed was known as the Kirby reaper with Burdick self-rake. In answer to my questions regarding his experience with self-rakes he replied that the Kirby self-rake was the only one that he ever owned and that he had no experience in the use of any other. I then visited the residence of Mr. George Heller, son of Gottlieb Heller, and saw the mower part of the Kirby to which his father alluded, complete, and I had no difficulty in recognizing it as the mower part of an old Kirby machine. I then showed the Exhibit Heller Butter Extension to Mr. George Heller, asking him if he recognized it as the one his father made. Oh, yes, he said, he knew it very well, as it came from the old Kirby self-rake of which his mower was a part. He further stated, in answer to my questions, that the sheet iron, of which this butter-extension was made, did not come from the mower part, but from the platform of the self-rake. Further, in answer to questions as to where they got their old Kirby self-rake, he replied that his father bought the machine in 1875 of Latner & Blakely, of Junction City, Kansas, and that this old Kirby self-rake was the only one they had ever owned, and the only self-rake machine that he had ever operated with. The answers and information obtained from both Gottlieb and George Heller were given freely and without hesitation. I told Mr. Gottlieb Heller that

his information corresponded with the deposition that he had given about a year before, as I had read the evidence and was
320 somewhat familiar with it. He then said to me, "O yes, I got it all in a book; they send me a book; got all what I said in it, and I read the book." He stated further to me, during my various conversations with him, that he did not think he got well paid for his testimony. He said to me, "I got an order for a self-binding machine, but I did not take the self-binder, I took a windmill and a buggy in place of the binder. I might have got more if I knew the thing was of so much importance."

Feeling confident in my own mind, that the piece from which this butter-extension was constructed was not from a part of the old Kirby machine, which Gottlieb Heller owned, or even from any other Kirby machine, I started on a hunt for the machine which it might have come from. I visited quite a number of parties who used the Beloit binder in an early day, carrying with me the exhibit to find some party, if possible, that had used such an extension, thereby expecting to trace it to some old machine, where it may have originated. After working several weeks in this direction, I finally discovered the man who used it and the man from whose old self-rake the piece was taken. This was one Gotthilf Schlesener, a farmer of Dickinson county, Kansas, whose residence is some eight or ten miles distant from Gottlieb Heller's and the same Gotthilf Schlesener, who has testified in this case before. I will say this man Schlesener recognized the parts of this exhibit in question both one and two, when I showed them to him, without a word of query regarding them on my part. He described in detail the manner in which he constructed it and that Gottlieb Heller assisted him in making it and putting it on, and his description is already a matter of record in this case and corresponds substantially with what he then told me. Mr. Schlesener, at the time I was at his place, pointed out to me the old self-rake from which he took this piece from the butter-extension, telling me at the same time that it was an old Triumph self-rake. The old Triumph self-rake which he showed me, he said was the only one, in fact the only machine that he ever owned, before purchasing a Beloit binder. This old Triumph machine was not complete, it having been in disuse for a number of years, but a sufficient number of the parts were present to enable me to recognize it as an old Triumph self-
321 rake. I will say here that my experience with that class of machine, not only enabled me to recognize such old parts of machines as the Triumph and Kirby, but I think I would be safe naming any self-rake manufactured and put upon the market in the United States; more especially machines manufactured between the years 1865 up to 1880. After my discovery at Mr. Schlesener's place, to make the evidence clear in my mind that this butter-extension exhibit came from a Triumph self-rake, I visited several places to find one of those old machines. Learning from Mr. Schlesener that his old Triumph self-rake had been purchased about the year 1875 at the town of Skiddy in Kansas, a town some

25 miles from Mr. Schlesener's place, I visited that place and found in the country not far from that town one of the old Triumph reapers, which was partly decayed, but a sufficient amount of it remained for me to recognize it as an old Triumph reaper and from which I obtained a corresponding piece to the one from which this butter-extension was made, and I will now produce the piece, which is called the sheet-iron divider of the Triumph reaper. It having been a long time since these reapers were manufactured of this identical pattern, I find it difficult to find any of them complete, but in the old machines that I have seen there is sufficient number of pieces present to enable me to identify them as Triumph reapers. No other machine that I have ever seen uses a sheet-iron divider of this style, or any part of which this adjuster exhibit might be constructed; that is, when taken into consideration the heft of the sheet iron and the piece of strap iron rivetted thereto, and also the style of painting and shape of the same. It will be seen that on one side of this Exhibit Butter-extension are marks indicating part of a circle, and the inside of these circle marks is an impression about an inch and a half in diameter indicating that some impression has been made by the end of a shaft. This I will say, is marks made by the grain wheel. I have measured the grain wheel belonging to this class of machines and found it to correspond with the marks of the Exhibit Butter-extension, and what I mean by this class of machines is the Triumph reaper grain wheel. It is two feet in diameter and the end of the axle upon which it revolves is an inch and a half in diameter. It
322 will be noticed that the axle impressions on this Exhibit Butter-extension, also on the sheet-iron divider of the Triumph reaper, and the marks indicating part of a circle agree on each of these pieces, and they were made evidently by the grain wheel in its revolutions, when in operation, the outer rim of the grain wheel making the circle marks and the axle from which it revolved making the impression about one foot from the circle marks. I have taken particular pains to look up this matter regarding the origin of the butter-extension exhibit and I am satisfied that it came from an old Triumph reaper. The square hole in one end of the strap iron, the painting, the outline that the strap iron describes, the heft or quality of the sheet iron, the manner of rivetting, all corresponding in this Exhibit Butter-extension, to the piece which I took from the old Triumph reaper myself, I think would be sufficient to satisfy the court that this Butter exhibit is a part of an old Triumph reaper. Regarding the Kirby self-rake machine, from which the witness Heller says he took this piece of sheet iron from which he made this Exhibit Butter-extension, I will say that I am sufficiently familiar with it, having had more or less experience with it for the last 25 years, and I recollect very distinctly that the sheet iron covering the platform of the old Kirby reaper was much lighter iron in thickness and when it was painted was painted only on one side and that of a plain black color with no ornament on it, and that it contained no strap iron rivetted to it.

Adjourned till Saturday, May 26, 1888, at 10 o'clock a. m.

SATURDAY, *May* 26, 1888—10 o'clock a. m.

Met pursuant to adjournment, present as before.

Q. 8. Have you read and considered the evidence, expert and otherwise, together with the various patents and exhibits offered in evidence by the defendants in reference to the inventions described and claimed in patent 272,598 and particularly the 20th and 21st claims thereof? If so, please state whether you regard any of said patents or exhibits as containing or exhibiting the inventions described and claimed in the said claims, giving your reasons fully for any opinions you may express.

A. I have read the patent referred to and think I am familiar with the elements embodied therein, especially claims 20 and 21. I
323 have also read the evidence in defendants' record bearing upon this patent and examined various exhibits, patents and models offered in evidence. The elements embodied in the 20th and 21st claim of this Steward patent operate in conjunction with other parts of a grain-binder to form good and convenient means for directing the flow of the grain and sustaining the same while the bundle is being bound and discharged from the machine. By reference to the drawings and specifications it will be seen that the improvements claimed in claims 20 and 21 of said patent are devices applied to and used upon the ordinary type of grain-binders commonly known as Appleby binders, provided with a sloping slotted deck, located at the delivery end of a harvester and the usual swinging revolving butt-adjuster, which engages the grain to produce the desired deflection in its line of travel, and also to even up the butts. To this butt-adjuster is attached an extension-board E $d^1$ which extends down the deck to the place where the bundle is formed and prevents the bundle, or any part of it from sliding forward, and for this arrangement claims 20 and 21 are made to cover. Claim 20 consists of two elements, namely, moving butt-adjusting combination and the board $d^1$. In view of the specifications, page 3, line 85, which reads: "The butting device may be of any kind competent to give the swath direction into the receptacle or it may be of the kind that moves the gavel bodily endwise," this claim is not limited, therefore, to a revolving butter but any moving butt-adjusting mechanism, operating to adjust the grain may be used, and still be within the limits of this claim, the wording of claim 20 being "a combination in a grain-binder of moving butt-adjusting mechanism and the board $d^1$ substantially as described." Claim 21 of this patent is for "the combination of the swinging butt-adjuster, the arms $d^2$, $d^3$, $d^4$ and the board $d^1$ pivotted to the swinging butt-adjuster, substantially as described." The elements embodied then in this claim 21 are three in number, the swinging butt-adjuster for engaging with the grain, the board $d^1$ for holding and sustaining the butts of the grain as they are being formed into a bundle and the arms $d^2$, $d^3$ and $d^4$ for holding and giving direction to the board $d^1$ so that it may at all times be at right angles with the bundle or parallel with the edge or end of the binder deck. That part of the specifi-

cations most pertinent to the description of claim 21 will be
324 found on page 1, line 75 to 90, which reads as follows: "Near the end of the arm $d^2$ is pivoted the bar $d^4$ connecting the arm $d^2$ with the overreaching arm $d^3$ near its top. In this arrangement we have four pivots, numbered 1, 2, 3 and 4. The distance between 1 and 2 is equal, or nearly so, to that between 3 and 4 and the distance between 1 and 4 to that between 2 and 3. In effect, then, the parts D, $d^2$, $d^3$ and $d^4$ describe a quadrilateral having substantially equal and parallel sides, so that to whatever point the frame D is swung in its adjustment the arm $d^2$ will remain parallel with the fixed arm $d^3$ and the board $d^1$ will always remain parallel with the edge of the decking, close to and over which the whole vibrates." The new and valuable feature therefore, involved in claim 20, is the combination of the board $d^1$ with the adjusting mechanism and the valuable results obtained from this combination are the directing of the flow of grain and holding the butts of the bundle square and in proper place to not only produce square-ended bundles, but to prevent straws from shaking out and scattering on the ground. The specifications being sufficiently explanatory of the operation when in actual use. The additional elements in claim 21 when compared with claim 20 is the swinging butt-adjuster and the arms $d^2$, $d^3$, and $d^4$, and what I understand by swinging butt-adjuster is one pivotted at its receiving end and its delivery end left free to be moved back and forth in accordance with the length of the grain that it may be placed in proper position to be bound centrally. The arms mentioned in said claim provide means for the automatic adjustment of the board $d^1$ when properly arranged to hold the board at all times in proper position to receive the grain and sustain it while the bundle is being bound

Turning now to defendants' exhibits introduced as anticipating these claims of the Steward patent and described and dwelt upon at some length by defendants' witness, Renwick, I will take them in the order given in the record. The Elward patent, May 9, 1876, No. 177,251 being the first one described therein.

This patent shows a fixed butt-board attached to the elevator frame and hinged at its upper end and provided with a pin near its lower end for the purpose of holding it in fixed position relatively with the deck, it is mounted upon a sloping deck, located at the delivery end of the harvester. In operation this board, marked
325 $F^1$ is intended as a guide to the grain as the grain is passing from the delivery of the harvester to the bundle receptacle and in cutting long grain it would be placed and fixed by the pin in the outer hole of the binder deck, nearly on a straight line with the end of the same. In this position it would have very little influence on the grain except to hold it from sliding forward on the binder deck. When in short grain, this swinging board $F^1$ with its lower end would be carried rearward and fastened by the pin to one of the holes for that purpose. The effect of this position of the board upon the grain would be to retard the butts and would produce quite an uneven and badly shaped bundle. Having had many years' experience myself in the harvest field with this class of ma-

chine and often experimenting with devices similar to this I am able to say this board would be impracticable and that it does not anticipate or show any of the elements contained in the Steward 20th and 21st claims is clear from the fact that it possesses neither the moving butt-adjusting mechanism or the board $d^1$ as described in the Steward invention, neither does it contain the swinging butt-adjuster or the pivotted board $d^1$, pivotted to the adjuster or the arms $d^2$, $d^3$ or $d_4$. As it contains none of the elements, which are the essentials of the Steward butt-adjuster and butt-adjuster extension it is difficult to see any bearing that it could have in this case. The fact is that instead of being an adjuster to the grain to deflect the flow of the grain and to make square-ended bundles, it would necessarily produce the opposite results, for the reason that in its action on the grain it being inert or stationary in its surface that engages the grain it would act as a retarder to hold the butts of the grain back, thus letting the heads drop, producing the opposite result which is attained by all modern binders.

The next patent cited by defendants' witness, Renwick, is one to Chapman, June 9, 1877. In this patent a hinged or swinging board is shown at the front end of a binder deck located at the delivery end of a harvester. This is substantially the same arrangement as that of the Elward, except that it is moved or swung by means under control of the driver instead of being fixed with a pin like the Elward. The result in operation would be the same and for the same reason as in Elward there are none of the elements
326 necessary to produce a butt-adjuster and retainer as is shown in Steward's invention.

The next patent cited, as showing Steward's invention, by defendants' witness, Renwick, is one to Buxton, No. 248,401, October 18, 1881. This machine shows a sloping binder deck located at the delivery end of the harvester with an adjustable board or arm located at the front side of the deck, substantially the same as that of Elward and Chapman, just above mentioned, with this difference, this board or arm is operated by a spring, but it contains none of the elements essential to a practical butt-adjusting mechanism, neither does it contain the pivoted extension board as shown and claimed in Steward's 20th and 21st claims. There is nothing in the patent shown either in the specification, diagrams or claims to warrant the assumption that any practical butt-adjusting mechanism is shown. As in the Chapman or the Elward the reverse is the fact. It shows a retarder to the butts of the grain and consequently an obstruction to the free flow of the grain instead of an assistant. I have reviewed the above exhibits very briefly for the reason that they are so foreign to the case that I believe the court will have no difficulty in arriving at a similar conclusion after a glance at them. If they contained any of the elements of a butt-adjuster or pivoted butter-extension, then there would be something to discuss. To be sure they show the sloping deck located at the delivery end of a harvester and a swinging board engaging the butts of the grain in its progress to the receptacle, but here all similarity ends. I have treated the boards as shown in Chapman, Elward and Buxton as

impracticable when used as adjusters, and my conclusions are derived from much actual experience in the field with similar devices. I am aware of the fact that the state of the art shows prior to the invention of Steward's 20th and 21st claims in patent 272,598 practical butt-adjuster mechanism as shown in Olin No. — and Appleby and Bullock No. —. However it is my opinion that prior to this Steward invention no such butter-extension and means for operating it as Steward's board $d^1$ was ever shown or used, at least not to my knowledge. Referring now to the Exhibit Heller's Sketch, and the evidence given by Gottlieb Heller regarding the same I will state, that the sketch is intended to show a butter-extension similar to that of Steward, and accord-
327 ing to Mr. Heller's evidence regarding the same, B represents the adjuster and C the extension; *f* and D represents the arms together with the cross-bar A, which was intended to guide the butter-extension and hold it at all times in proper position, namely, parallel with the edge of the binder deck and at right angles with the bundle as it is formed. I am aware that he says that he used devices of this nature in the field and that they operated satisfactorily producing the desired result, namely, that of keeping the bundles square, the part C always standing parallel with the edge of the deck, no matter at what angles the part B should be placed. He also produced a sheet-iron butter-extension which he says in answer to cross-question 18 was the identical extension used by him as the part C shown in the sketch, "Defendants' Exhibit Heller Butt-adjuster, with Butter-extension, Parts 1 and 2," being, according to his evidence, the identical parts used by him on his binder 1878, and according to which this sketch was made. The link D he could not produce, as he says it was lost or used for some other purpose. According to Heller's evidence this butter-extension was used but very little, a part of the harvest of 1878 and a little in 1879; that previous to putting on this part C, butter-extension, which is shown to be pivotted to the adjuster he used a tin or sheet iron nailed rigidly to the adjuster. By examining the adjuster frame which he identifies, Exhibit Part 1, as the one used by him it is very plain to be seen that no such extension was ever nailed thereto for the reason that if any such piece had ever been nailed thereto the traces of such nailing would necessarily have been left. There being no marks of nails, or nail-holes except the ones used in the construction of the frame it would be safe to infer that there never had been any such piece nailed to it as he has described. There are discrepancies in this Heller sketch which would make it inoperative as a butter-extension for the purpose required, the part D, as represented in the sketch being considerably too long to keep the extension in proper condition when the adjuster is being swung. The fact, which he should have known had he ever used the extension pivotted and guided in this manner, is that the pivot points of part D should have been the same distance apart as the pivot points in part B. What I mean by the pivot points in
328 the part B, is where the extension C is pivoted at the lower end of the adjuster and the pivot point of the butter at its

upper end, as shown in the sketch. However, to avoid this discrepancy in the sketch, he has produced another sketch on the opposite side of the page upon which this sketch is made, wherein he shows the part D, and a slotted connecting link marked *g*. This slotted piece *g* he says was used in connection with the link D, so that the proper length could be obtained for the various positions of the butter. If he used the devices in accordance with the sketches that he has produced, using the slotted link *g*, for an adjustment, then his butter-extension C, was not automatically adjustable, for when he wished to swing his butt-adjuster B, it would be necessary in order to keep the butter-extension at right angles with the bundle to make a separate adjustment in link *g* and D. This being the fact his sketch does not show the arms for producing the proper adjustments of Steward's 21st claim $d^2$, $d^3$ and $d^4$, or their equivaalents, as the Heller arrangement would not be operative in the same manner to produce the same results. The part D, and the part *g*, not being produced and the sketch of these parts having been made from memory, according to his evidence, at least five years after he made and used them, it would seem quite uncertain what he did use, particularly when taking into consideration the facts that I have before stated regarding the Exhibit "Heller Butter and Extension, Parts 1 and 2," which he so positively identified as being the parts used for his experiment, and the fact that the sheet-iron butter-extension was not made from his old self-rake reaper and by himself alone but was made from a part of an old Triumph reaper belonging to a man some eight or ten miles distant from him, by the name of Schlesener, who has testified regarding the construction and use of this exhibit and to whose evidence there is much, in my experience, to confirm, it being shown by Schlesener's evidence that this identical exhibit referred to was used by himself on his own farm and in his own harvest in 1879, as he testifies the part 1 of butter-adjuster was used without any extension and that in 1880 the part 2 of butter-extension being made by himself and Heller from a piece of his old Triumph reaper and used in that year as a butter-extension fastened to his butter frame rigidly, that no such crank or pivot point as is shown in the exhibit was in it when it
329 left his place the spring of 1882, and it being further shown in evidence that this butter-extension exhibit was retained in the possession of Richard Messing, a witness who has testified in this case, until the season of 1883 after which these parts together with the harvester and binder returned to the possession of Gottlieb Heller and up to this time there was no such crank as now appears in the strap iron which is rivetted to the sheet iron, on the contrary this strap iron was straight and bolted rigidly to the adjuster frame. The holes in the adjuster frame to which it was shown this butter-extension was made fast are marked X and XI, and as the distance apart of these holes conform to the distance apart of the rivets in the sheet-iron butter-extension would indicate that the old rivet-holes in the strap iron were utilized to bolt and screw the same to the adjuster.

In the deposition of defendants' witness, Renwick, page 393, of

Defendants' Record he makes the following statement: "Steward makes the inclined board the equivalent of the butting and makes one the substitute for the other, and therefore the substitution of a butter-apron in the Buxton patent, for the Buxton butting board would not be a patentable invention and if this substitution were made then Buxton would show substantially the same device that is described by Heller and used in defendants' machine." Regarding the first part of this statement, I wish to say I have examined this Steward patent very carefully and I find nothing in it to warrant the expression that "Steward makes the inclined board the equivalent of the butting apron and may use one for a substitute for the other." What Steward does say is that "the modifications that may be made in this arrangement are almost unlimited. For instance, the butting devices may be of any kind competent to give the swath direction into the receptacle, or it may be of the kind that moves the gavel bodily endwise." As I have previously shown, the inclined board, as used by Buxton, Chapman and Elward would not be competent to give the swath direction into the receptacle, that they act more as a retarder than as an adjuster, giving direction to the swath.

Adjourned till Monday, May 28th, 1888, at 10 o'clock a. m.

330 MONDAY, *May* 28, 1888—10 o'clock a. m.

Met pursuant to adjournment.
Present as before.

Witness resumes:

Regarding the defendants' Winona machine, I will say that it contains all the elements of the Steward 20th and 21st claim of patent 272,598 operating in like manner to produce the same results, namely, the moving butt-adjusting mechanism and the board $d^1$ pivoted to the swinging end of the adjuster, and those two parts are not only the mechanical equivalents but are of the identical construction and operation, located in the same position relatively with the delivery end of the harvesting machine and the inclined binder deck. In addition to the elements which constitute Steward's 20th claim the arms $d^2$, $d^3$ and $d^4$ are present if not in the identical construction, they are the mechanical equivalents forming Steward's parallelogram for holding the board $d^1$ at all times at right angles to the gavel in any position at which the butt-adjuster may be placed. The parts in this Winona machine which unite to form the parallelogram, as shown in the Steward patent, and lettered and numbered $d^2$, $d^3$, $d^4$ and $d$ are as follows: The top bar or ridge of the elevator frame, the frame of the butt-adjuster, the lever for operating the adjuster and the sliding bar connecting the lever to the butter-extension or butt-retaining board. The top bar or ridge of the elevator frame in this Winona machine corresponds to $d^3$ of Steward's patent. The frame of the butt-adjuster corresponding with Steward's $d$, the lever for operating the adjuster corresponding with Steward's $d^4$ and the sliding bar connecting the lever to the

butter-extension or butt-retaining board corresponding with $d^2$ of Steward's patent. In the arrangements of these parts in the Winona machine I find all the elements of the Steward 20th and 21st claims, to wit; the moving butt-adjusting mechanism, the board $d^1$ and the parts corresponding to Steward's $d^2$, $d^3$, and $d^4$ and $d$, forming a parallelogram, the butt-adjuster being the identical swinging butt-adjuster in Steward. This being the fact it must appear that the Winona machine contains the invention of Steward's patent 272,598 as shown and described in the diagrams and specifications and claimed in the 20th and 21st claims.

331 Cross-examination by Mr. DYRENFOTH:

X Q. 9. Do you understand that a patentee may have a patent for a function?

A. I don't know that I am sufficiently posted in patent law to answer your question, but I will say that what I do understand regarding patent law and patents is that a man may have a patent for a certain device or element to produce certain functions. The function alone is not patentable.

X Q. 19. Then you understand do you not, that a patentee cannot claim a result but can only claim certain mechanism for effecting a certain result?

A. Directly or indirectly, I believe in some cases it has been decided that the result, if new, becomes a part of a patent if it is a new result, although the mechanism or devices may be old. This is my understanding, though I cannot quote my authority for it.

X Q 11. Suppose a patentee claims specifically a certain combination of elements whereby a defined result is accomplished, does that claim, in your opinion, cover every other possible combination of elements whereby that same result may be accomplished?

A. No, I think not, unless the mechanical equivalent of the devices so claimed were to be used, or in other words, it would hold the specific devices and all mechanical equivalents of the devices, although they might differ in construction.

X Q. 12. In other words, if a claim covers the combination of A, B, and C, a device, in order to infringe that claim, would have to contain the combination of A, B, and C, or equivalents thereof, element for element, would it not?

A. With my limited understanding of patent law or decisions regarding the same I am of the opinion that it would.

X Q. 13. Suppose that the parts D, $d^2$, $d^3$, and $d^4$ did not describe a parallelogram in the Steward device what would be the result in point of operativeness?

A. If there was a sufficient deviation of difference in the parallel sides in Steward's parallelogram the board $d^1$ would not perform its proper functions from the fact that it might be varied thus from a right angle of the bundle or gavel which came in contact with it, and thus destroy the functions for which it was intended.

332 X Q. 14. Then parallelism of those parts is of the essence of the Steward invention, is it not?

A. No, I think the essence of the Steward as embodied in the 20th and 21st claims is the board $d^1$ pivotted to the adjuster mechanism and the means employed for holding it at all times in proper position, namely, the parallelogram form only a part of said essence.

X Q. 15. Then is it not true that the parallelogram is of the essence, that is, a part of the essence, as you say?

A. Yes, that is true of the 21st claim, but not of the 20th claim of Steward's patent, as the 20th claim reads for "the combination of a grain-binder of moving butt-adjusting mechanism and the board $d^1$, substantially as described."

X Q. 16. Do I understand you to say that in your opinion the Winona machine contains the subject-matter of the 21st claim because certain parts of which the actuating lever is one form a parallelogram?

A. Yes, I believe that is what I have described as the part of a parallelogram in the Winona machine.

X Q. 17. In the Winona machine does not that actuating lever constitute the medium for pushing and pulling upon a rod which enters a socket secured to the upper end of the extension at right angles to the latter?

A. Yes, I think this is true, as you have described it.

X Q. 18. And does not that rod upon which the pushing and pulling is exerted, slide forward and back in guides which keep it parallel with the lower end of the grain table?

A. Yes, that is the fact as regards the Winona machine, the guides that you mention are present; however, they are not essential in holding it in place as your question states the rod being held at one end by the actuating lever and the other end by the socket or thimble connected to the adjuster mechanism.

X Q. 19. In the Winona machine does not the end of the sliding rod enter a slot in the lower end of the lever which permits to it sufficient play to compensate for the arc described by the lower end of the lever?

A. Yes, I believe that is a fact. There is some play in the connection; however it is not essential that the play should be at this point. The play or slack at the pivot point of the lever would answer the same purpose, or slack at either place or both places might be used.

333 X Q. 20. But without that play or slack the rod would bind in the guides would it not?

A. Yes, there would be some cramping if the joints were close fitting, and if the guides that you mention were also close fitting.

X Q. 21. And if there were no guides to maintain the rod in a horizontal position, and it were connected without slack or play to the actuating lever, the moving of the lever forward and back would cause the rod to describe a compound instead of a single movement would it not?

A. Yes, it would cause a slight deviation from a straight line fore and aft, as it is located.

X Q. 22. And since the rod enters a rigid socket in direct line

with it such a deviation from a straight line in the rod would produce a corresponding deviation in the board extension from parallelism with the front edge of the deck, would it not?

A. Yes, I think that is correct.

X Q. 23. Then does not the Winona device for actuating the butter and extension comprise a rigid socket on the upper end of the extension at right angles with the latter, the horizontal rod movable back and forth within guides and fixed within the socket referred to, and a mechanical agent for permitting the horizontal rod to be moved forward and back by the driver?

A. Yes, I think that is about the description of it.

X Q. 24. Then would not any agent which would permit the rod to be moved forward and back by the driver be the mechanical equivalent of this lever; of course I mean any well-known mechanical agent which might be substituted for that lever to produce a like effect upon the horizontal sliding rod?

A. In order to answer your question and be clearly understood as to what I mean in my answer, I will say first, the horizontally moving rod, to which you refer in the Winona machine is actuated by a lever, to move it forward and back for the purpose of adjusting the butter to various conditions of grain and this rod at the same time being connected to the butter-extension and sliding parallel with the lower edge of the binder deck holds the butter-extension at all times at right angles with the accumulated gavel. As I have said, in this Winona machine the lever is the means employed to correspond with Steward's $d^4$. Of course there would be other ways of attaching a lever to produce the same effect. If the lever were to
334 be cut off at its central pivot point and attached to the butter as in Steward's patent the operations would be the same, the only difference being that a longer piece would be required for a lever thus used and the piece which might be cut off from the lever as now used in the Winona machine. These changes in construction would not involve any changes in the principles employed, only making a slight difference in the mode of construction, and this being a matter of choice with the manufacturer. For this reason, I would say yes, to your question that it makes no difference where the lever is placed so long as it produces the same result it would remain the mechanical equivalent.

X Q. 25. Then it is necessary in the Winona machine that the parts constitute a parallelogram?

A. Whether it may be absolutely necessary or not may be a question, but that these devices of the Winona machine do produce a parallelogram is a matter of fact, in my opinion.

X Q. 26. Suppose the lever instead of being so pivotted as to slide the rod by a moving parallel with the butt-adjuster were so pivotted as to slide the rod by moving in directions contrary to those of the butt-adjuster, would not that be the full mechanical equivalent of the lever, as it exists in the Winona machine?

A. So far as changing the power or operation of the lever I cannot see that it would make any difference so long as it could be operated to produce the desired result. The fact is that the operating end of

the lever, as it is now used on the Winona moves in the reverse direction to the adjusting mechanism. What I mean by the operating end of the lever is that part which the operator takes hold of to produce the proper adjustments when it is moved backward from the machine the adjusting mechanism is moved forward of the machine and *vice versa*.

X Q. 27. You can readily conceive a mode of pivot*t*ing that lever whereby instead of preserving parallelism with the butt-adjuster in its movements it would diverge from parallelism with the butt-adjuster in its movements, can you not?

A. I think I can.

X Q. 28. And would it not still operate as a medium for permitting the driver to slide the horizontal rod back and forth?

A. I think it would, but whether such an arrangement as your question describes might be made practical for this purpose, would, in my opinion be a question of doubt.

335 X Q. 29. Assuming that it might be made practical would it not constitute the well-known mechanical equivalent of the lever as it exists in the Winona machine?

A. The only difference in the two levers to which you refer, as I understand your question, is simply a change in the operation of the same lever. In the Winona machine the fulcrum of the lever being between the operator and the part moved, while in the other lever the part moved would be between the fulcrum and the operator. If they are so arranged (the levers) that the part moved by the lever would travel the *the* same distance relatively with the operating end of the lever in each case, then one would be the mechanical equivalent of the other.

X Q. 30. And yet, in one form the parallelogram, of which you, Mr. Steward, and Mr. Bates, have had so much to say, would be preserved, and in the other it would not be preserved, is not that correct?

A. Yes, I think you are correct, and I believe there has been much said regarding this parallelogram in the record by Mr. Bates and Mr. Steward and something by myself, as you have suggested in your question, but I believe it has been strictly confined to the facts in the case regarding the Steward patented devices and the devices used upon the defendants' Winona machine.

X Q. 31. Now Mr. Whitney, if parallelism in the parts is an all-essential attribute in the Steward combination and is not an essential attribute of the Winona combination how can the two combinations be the same?

A. Whether it is essential in the Steward device or not it is there, and whether it is essential in the Winona device or not it is also there. The matter of producing a practical butt-adjuster with adjustable extension as in Steward's without the use of the principles employed by Steward has, as yet, not come under my observation.

X Q. 32. I believe you have stated in your direct examination that Mr. Heller testified that the slotted piece *g* in his sketch was used in connection with link D, so that the proper length could be

obtained for the various positions of the butter. Please state where in Mr. Heller's testimony you find an allegation to that effect?

A. I find it in answer to X Q. 64, on page 161, wherein Mr. Heller states "I had another iron on the board to which this one was connected to slide. I could not get the length of bar D
336 exactly right and made this iron to adjust it on. I would slide it in the iron to the right length and then make it tight with a bolt."

X Q. 33. And do you consider that, taken in conjunction with the rest of Mr. Heller's testimony, a warrant for your sweeping assertion that Heller testified that he used that device so that the proper length could be obtained for the various positions of the butter. In other words, do you find that Mr. Heller speaks of separate adjustments for the various positions?

A. In Mr. Heller's expressions I do not find the words "proper adjustments" but I find the word "adjust" and the language which he uses when he says "I couldn't get the length of the bar D exactly right and made this iron to adjust it on." I infer from this language that there was an adjustment made. Referring to his sketches I find that adjustments would be necessary. In accordance with the proportions of his sketch if he made the adjustment corresponding with that sketch to be right in one positson of the adjuster, it would be wrong in some other position. This was necessarily the case as his rod D was rivetted as he says to plate *g*. In answer to X Q. 71 he says, I put rivets in at the time I made it, and directly following, in answer to defendants' counsel's question he says, "The rod was fastened to the extension at the lower end loosely with rivets; it was fastened to plate *g*, with a bolt." This language together with the sketch, would indicate very clearly that he could not get this rod the right length and that when he wanted an adjustment made it would become necessary to loosen the bolt in plate *g*, and fix the adjuster extension in accordance with the requirements of the adjuster which he wished to make. He says again in answer to X Q. 68, page 161, "The rod was not extensible but by means of the slide I could make it longer or shorter." Further, it would seem that this butter-extension never worked very satisfactorily to him, from the fact that he never used it much. According to his evidence, and that of his son George, he used it a part of the harvest of 1878 and a very little in 1879.

By Mr. DYRENFORTH: Allow me to interrupt you Mr. Whitney by asking you whether you consider yourself a witness or an attorney in this case?

Answering the last question of the attorney, I will refer him to the record in this case.

337 He states that in the last-mentioned season his grain was too short to bind and he cut it with a header. This expression would indicate that his butter-extension was not practical in its operation for the reason that short grain is especially the kind of grain that it should give the most satisfaction in, for the reason as I have often seen in the field, that with the Steward butter-exent-

sion any grain that is long enough to be cut by the harvester could be made into bundles in a very satisfactory manner, and further, the fact that he never used it afterwards, as is shown by his evidence, would indicate that it was not a practical butter-extension, or even if it did work satisfactorily that it became an abandoned experiment.

Adjourned till May 29th, at 10 o'clock a. m.

MAY 29, 1888—10 o'clock a. m.

Met persuant to adjournment.
Present as before.

X Q. 34. If you please, Mr. Whitney, we will now return to the point from which you digressed as a witness in order to make an argument in behalf of the complainant as an attorney. In the statements to which I have referred in your direct examination you were not pretending to quote Mr. Heller then, but were giving your inferences drawn from certain parts of his cross-examination, is not that correct?

A. Yes; I was giving ideas that Mr. Heller's evidence conveyed to me when reading it and which I believed to be correct.

X Q. 35. I understand you to say that at the time you were at Mr. Heller's farm endeavoring to gather information no part of the sheet-iron portion of his Kirby rake remained, is that correct?

A. Yes, that is in accordance with the facts, so far as anything that I saw.

X Q. 36. How many times have you conversed with Mr. Gottlieb Heller in your life?

A. I visited his place last March and April on three different occasions, and had more or less conversation with him.

X Q. 37. Did he express himself freely and frankly to you in regard to anything that he had done in connection with this butt-adjuster extension?

A. So far as answering my questions he did, and in some respects he volunteered information not asked for.

338 X Q. 38. Did he tell you when it was that he had been given a harvesting machine by the McCormick Company?

—. He did. He said it was the season before.

X Q. 39. What season would that be?

A. That would be nearly a year ago.

X Q. 40. In other words, it would be about the summer of 1887, would it not?

A. Some time in that season. In order that I may be understood I will say as nearly as I can what he told me regarding the present of the machine from the McCormick Harvesting Machine Co. He told me that he received an order from them for a machine on their agents at Abilene, but having all the harvesting machinery that he wanted he traded it to the McCormick agents at Abilene for a buggy and windmill.

X Q. 41. And don't you know that Mr. Heller first testified in this case in the fall of 1886?

A. I believe that is the date of his first deposition.

X Q. 42. And do you not know that in his testimony given in the fall of 1887 it was developed that he had used a spring wind-board on his binder as early as the year 1878; at least, do you not know that Mr. Heller's testimony was to that effect?

A. I am aware that in his deposition he describes some device similar to that described in your question.

X Q. 43. And do you not know that in the spring of the year 1887 Mr. Heller, at the instance of the McCormick Co. spent considerable time and used considerable exertion to find witnesses to confirm his statements concerning that wind-board, or don't you know anything about it?

A. I know that defendants' record shows that several witnesses were examined regarding this feature, but I do not know whether Mr. Heller expended much time and energy procuring these witnesses, neither do I know to the contrary.

X Q. 44. Assuming that it did, do you not think that he ought to have been paid for it?

A. I would think it would be no more than right to pay him for what time he spent in his labors for the defendants.

X Q. 45. You have not been pursuing your investigations in behalf of the complainant as an act of charity, have you Mr. Whitney—unless charity begins at home?

339 & 340 A. I expect to be moderately well paid and have been so far for all time and exertion that I have spent in this case.

X Q. 46. And you do not think, do you, that that fact ought in the smallest degree to go toward casting discredit on your testimony?

A. I hope not at least, and I expect to submit to the court that shall have such evidence to weigh.

X Q. 47. Did Mr. Heller tell you that he received that order for a self-binder from the McCormick Co. as a reward for testifying falsely in this case?

A. I don't recollect any such expressions on the part of Mr. Heller, he did not suggest to me that he had sworn falsely in this case, in fact his efforts were all in the other direction: his efforts were to convince me that he had testified correctly in this case.

CHARLES WHITNEY.

341 & 342 Testimony in rebuttal on the part of complainant before George F. Payson, a notary public in and for Cook county, Ill., at the office of Banning, Banning & Payson, 225 Dearborn street, Chicago, Illinois, this 19th day of November, 1888, by agreement of parties.

Present: On the part of the complainant, Thomas A. Banning, Esq., and on the part of the defendant, P. C. Dyrenforth, Esq.

JOHN F. STEWARD, the witness, recalled on the part of complainant in answer to questions by Mr. BANNING, deposes and testifies as follows:

Q. 1. John B. Kirch, on page 573 of the defendants' printed

record, testified that he made some experiments in March or April, 1881, in which he held a board against the butts of the grain below the butt-adjuster; and on page 576 he says that in the latter part of June, 1881 he went to Mr. Deering's factory and explained what he had done to Mr. Carver and Mr. Deering. Please state when you first learned that Mr. Kirch had visited Mr. Deering's factory and made these explanations to Mr. Carver and Mr. Deering, if you can?

A. My first knowledge of what he testified to as facts was acquired from defendants' printed record in this case some time during the latter part of the year 1887. As to his having called at the works of Deering & Co. and explaining any such, or similar device, I have no knowledge, nor have I been able to acquire any information upon this subject. During those years it was my business to consider any suggestions brought in by parties or contained in letters, and if Mr. Kirch was ever there under the circumstances which he states, he would certainly have been referred to me. I knew him well and do not remember of having seen him, but am positive that I received no information from him that he had ever produced or conceived any ideas of such a device. It is possible that I was absent from the works, however.

(The answer is objected to as argumentative, and as not giving the best evidence.)

Q. 2. Then you had no information, either directly or indirectly of Mr. Kirch's experiment, at the time you made the invention embodied in this model, marked "Complainant's Exhibit Steward 1880 Model." Is that correct?

A. Yes, that is correct.

343–352 Circuit Court of the United States, District of Minnesota.

WILLIAM DEERING
*vs.*
THE WINONA HARVESTER CO. *et al.* } In Equity.

For the purpose of avoiding the necessity of taking the deposition of Christopher Breuscher, it is hereby stipulated and agreed that the said Breuscher if called as a witness would testify that he made the model marked Complainant's Exhibit Steward 1880 Model, and completed the same in or about February, 1881; that he made and completed said model under the directions of John F. Steward as stated by the said Steward in answering question 4, on page 396, of Complainants' Printed Record; and that said model now is in all respects just as it was made, except that the rubber, used as a spring on said model at the time it was made, has been almost wholly broken off and lost.

Chicago, July 21, 1888.

BANNING & BANNING,
*For Complainants.*

PARKINSON & PARKINSON,
*For Def'ts McCormick H. M. Co.*

DYRENFORTH & DYRENFORTH,
*For Def'ts Winona Harvester Works et al.*

353 GOTTLEIB HELLER, a witness in behalf of said defendants, being duly sworn, deposes and says in answer to interrogatories propounded by Mr. DYRENFORTH as follows:

Q. 1. What is your name, age, residence and occupation?

A. Gottleib Heller; age, 46 years; reside on a farm near Dillon, Dickinson county, Kansas; occupation, farmer.

Q. 2. In addition to your occupation as a farmer, have you ever acted as an agent for the sale of grain harvesters and binders? If so, please state for what company or companies you have acted in that capacity, and when.

A. Since 1880 I have been agent for the Beloit Harvester Company—now the Milwaukee Harvester Company.

Q. 3. Had you any experience with harvesters and grain-binders prior to the year 1880?

A. I bought in 1878 one harvester and twine binder.

Q. 4. Did you use that harvester and twine binder in the field for cutting and binding your grain in the year 1878?

A. I did.

Q. 5. From whom did you buy that harvester and twine-binder in the year 1878?

A. From Ruben Bros., at that time agents for the Beloit Co.

Q. 6. Did the Beloit machine, at the time you bought it in 1878, have on it a butt-adjuster comprising a frame at one edge of the deck provided with rollers and an endless canvas apron or belt?

A. Yes.

354 Q. 7. Was that butt-adjuster adjustable back and forth through the medium of a rod carried up within reach of the driver, after the usual manner of such devices in harvester machines?

A. Yes.

Q. 8. In the use of that machine did you find any defect to exist in the butt-adjuster, and did you proceed to correct that defect by means of any mechanical attachment? If so, please state what the defect was and what means you adopted to correct it in the year 1878.

A. I found when the grain was short and thin it didn't make the butt good on the bundle. I extended the adjuster so to keep the straw of the bundle even. First I only nailed a piece of tin or sheet iron on. That didn't satisfy me, and then I made an extension out of sheet iron and heavy hoop iron. I made that so as to be just straight with the butt of the bundle. In this way it satisfied me. Of course I made it so it would adjust and keep straight with the butts of the bundles.

Q. 9. Please describe how you attached it so that it would always keep straight with the butts of the bundles?

A. That I could easier show than describe.

Q. 10. Can you make a drawing or sketch representing the adjustable extension and the butt-adjuster, and describe it from that?

A. I can make a rough pencil sketch.

Q. 11. Please do so.

Witness proceeds to make a sketch in pencil, and after a few moments produces a pencil sketch which counsel for defendants offers in evidence, and the same is marked "Defendants' Exhibit Heller's Sketch."

355 Q. 12. Please describe the construction and operation of the device represented by your sketch, using for the purpose of description the letters of reference marked on said sketch.

A. A is the top board on the harvester. B is the butt-adjuster which I received from the factory. C is the extension of the butt-adjuster which I put on. *f* is an angle or link of iron, and D is a rod to keep the butter-extension straight if the adjuster got moved. D is fastened on the top board of the harvester to connect it with the link *f*, and E is the rod where the driver of the machine adjusts the butt-adjuster.

Q. 13. How was the extension which you put on fastened to the lower end of the butt-adjuster?

A. Fastened with a screw or bolt.

Q. 14. Was it fastened only on top of the butt-adjuster?

A. No; it was fastened both below and on top.

Q. 15. Was the fastening of the extension to the butt-adjuster as represented in your drawing a rigid or pivotal connection?

A. It was fastened by a bolt so it could be moved.

Q. 16. How was the rod D fastened to the angle *f* and the top board A?

A. It was fastened by bolts so that it could move.

Q. 17. How was the angle or link *f* fastened to the extension C?

A. With rivets.

Q. 18. Have you in your possession here the identical device comprising the butt-adjuster and the extension which you added to it, that you used on your farm in the harvest of the year 1878? If you have, please produce it.

A. I have, and I here produce it.

356 Witness here produces a device in two detached parts, which is offered in evidence by counsel for defendants, and marked "Defendants' Exhibit Heller Butt-adjuster with Adjustable Extension, Parts 1 and 2."

Q. 19. Is that the device which you have undertaken to represent in the sketch which you have made?

A. Yes, sir.

Q. 20. What kind of a view of that device does the drawing represent?

A. A top view.

Q. 21. What part of the drawing represents this frame with the rollers?

A. Part "B."

Q. 22. What part of the drawing represents this plate of sheet iron?

A. Part "C."

Q. 23. What part of the drawing represents the projecting strip of iron with two holes in it attached to the sheet-iron plate?

A. Part "*f*."

Q. 24. Does the device which you have produced include the rod D of your sketch?

A. No; that's been gone a long time; I used it for something else. Have looked for it, but couldn't find it.

Q. 25. How was the sheet-iron extension which you have produced fastened to the butt-adjuster, which you have also produced?

A. It was fastened by the bolt on the top edge and the screw on the bottom edge of the butt-adjuster at the present time.

Q. 26. What did the bolt on the top edge go through, and what did the screw on the bottom edge go through?

357 A. The bolt went through the hole in the link or angle nearest the sheet iron, and the screw went through the hole in the flange on the lower or opposite edge of the sheet iron.

Q. 27. Where was the rod D fastened to the angle or link in this device?

A. By a bolt through the hole nearest the outer end of the link.

Q. 28. Where was the rod E by which the butt-adjuster was shifted by the driver fastened, in the device which you have produced and which has been offered in evidence?

A. It was fastened at the upper end of the butt-adjuster. In the drawing I did not put it on right; I put it on as in the new machines; but the way it was put on Exhibit Heller Butt-adjuster, with Extension, I now show by dotted lines.

Q. 29. At the time the butt-adjuster was used, what was passed longitudinally around it over the rollers?

A. An endless-belt canvas apron.

Q. 30. When was the device which you have produced and which is marked "Defendants' Exhibit Heller Butt-adjuster with Adjustable Extension" used by you in the field, and to what extent was it used?

A. I used it in the harvest of 1878, but I can't tell how long exactly.

Q. 31. Did you harvest and bind grain with a machine that had that on?

A. Yes.

Q. 32. Did you use it as much as one day?

A. Oh, we used it more. Don't know how many days.

Q. 33. Did you use it for a considerable number of days in that harvest?

358 A. Yes.

Q. 34. Did you harvest and bind more than one acre of grain with the machine that had that particular device attached to it?

A. Yes, we cut 250 acres, but at first I didn't have that thing on. We cut and bound a good many acres with that thing on, but I couldn't say how many.

Q. 35. In the harvest of 1878 when you used a machine with

that particular exhibit attached to it, was it used in such a way that others could see it used and did other persons in fact see it used?

A. Yes.

Q. 36. In answer to Q. 32 you used the expression "Oh, we used it more." Whom do you refer to by the word "we"?

A. My wife and son did help harvesting, and my wife and son drove the machine. My wife's brother also helped; the latter has since died. I used it on my farm and my brother-in-law's as well. He helped me and I helped him.

Q. 37. Was this butt-adjuster of 1878 which has been produced in evidence shifted back and forth as circumstances required in the use of the machine in that year?

A. Yes.

Q. 38. When the lower end of that butt-adjuster was shifted either way what happened to the adjustable extension?

A. It kept straight with the butt of the bundle.

Q. 39. Did it move backward and forward when the butt-adjuster to which it was attached was moved backward and forward?

A. Yes.

359 Q. 40. What do you mean by saying that the extension always remained straight with the butts of the grain when the butt-adjuster was moved?

A. So as to make the butts even in the bundle. The angle of the butt-adjuster changed as it was moved, but the angle of that extension did not change.

Q. 41. Was that the only improvement which you added to that particular machine in the harvest of 1878?

A. I made more—some other improvements.

Q. 42. Did you make any attachment to the machine at the opposite side of the deck from the butt-adjuster? If so, please state what it was.

A. We made then a board; I made some of sheet iron and some of board.

Q. 43. What was the purpose of that attachment?

A. So the heads don't fall down too quick, and to hold the heads up and prevent the wind from scattering them.

Q. 44. How was that board fastened on your machine?

A. I had kinds of hinges, small hinges with three or four screws in. I generally used what I happened to have on hand. I screwed one leaf on the board and the other on the harvester frame.

Q. 45. What part of the board were the hinges fastened to?

A. On the upper end.

Q. 46. In what position did the board stand?

A. It was hinged to the frame in about the position of the butt-adjuster except on the opposite side of the deck and rested on one edge at an acute angle to that edge of the frame.

360 (NOTE.—This answer is in the words of the notary from an illustration of witness by means of two books. Consented to by counsel.)

Q. 47. What, if anything, held this hinged board in the position named?

A. It was held by a soft spring. I used two kinds. One was a spiral spring on the board of the harvester, and that was a little too stiff. I couldn't get the spring to suit, and then I made one of wire. I can make something to show it more easily than I can describe it. (Witness makes an illustrative model by means of a lath and a piece of wire, and continues:) This shows the second form of spring, the lath representing the wind board. The wind board was hinged at the end where the coil is in the spring, and the free end of the spring rested against the end board of the binder. When the heads of the grain pressed against the wind board, the spring, which was made of spring wire, would give and let the board move backward and the heads pass down.

(Counsel for defendants offers in evidence the model made and referred to by the witness, and the same is marked "Defendants' Exhibit Heller Wind Board and Spring.")

Q. 48. To what extent was that hinged wind board and spring used by you in the field in the harvest of 1878?

A. It was used through the whole harvest.

Q. 49. Was it used openly so that others could see it in operation, and did other persons in fact see it in operation in 1878?

A. Yes.

Q. 50. Look at Fig. 3 of the Steward patent No. 272,598 and state whether you find there anything corresponding with the ex-
361 tension to the butt-adjuster made and used by you as you have described in the harvest of 1878.

A. What I see there seems to be the same principle as mine.

Q. 51. In the same figure of the drawing of the same patent, do you find anything corresponding with the hinged wind board and spring made and used by you as you have described in the harvest of 1878?

A. It is the same principle and the same purpose. I first used a spiral spring as is shown here in this drawing, but that was too stiff, so I changed for the other form of spring, on the other side of the board, as I have described.

Adjourned at 6 p. m. to 10 a. m. Sept. 3d, 1886.

SEPT. 3D.

Met pursuant to adjournment at 10 a. m.

Present as before.

Q. 52. Have you any interest, directly or indirectly, in the result of this suit?

A. No, I have none.

Cross-examination by Mr. BANNING:

X Q. 53. As I understand you, you never had any experience with harvesting machines of any kind before 1878?

A. No; I never had any, except that I had a self-rake before.

X Q. 54. You never had any before that time with a machine in which it was necessary to keep the butts of the grain even for binding?

A. No.

X Q. 55. How long was it after you got your binder from Rubin Bros. that you put an extension on the butt-adjuster as stated in your direct examination?

362 A. Within a few days; I cannot tell exactly.

X Q. 57. Was this exhibit here before you, marked "Defendants' Exhibit Heller Butt-adjuster with Adjustable Extension," the one you put on first at that time?

A. I put first a sheet iron on, but that was not exactly an extension. This is the first (referring to exhibit) that I put on.

X Q. 58. Did you afterwards put on any other or others?

A. Well, I put some other ones on, on some other binders.

X Q. 59. How did this one, the exhibit above referred to, operate—satisfactorily or not?

A. Yes, it worked satisfactorily.

X Q. 60. Did you have any difficulty with it?

A. I had a little, that I split the board off the top part.

X Q. 61. You mean the board designated by the letter A in this sketch which you made yesterday, marked Defendants' Exhibit Heller's Sketch?

A. Yes; that split off on the corner that is at the end next the butt-adjuster.

X Q. 62. How many times did it split off in this way?

A. It split only one time. I nailed it on again and fastened it.

X Q. 63. Did it stay after that?

A. Oh, it got loose a few times and I fastened it on again.

X Q. 64. Your sketch above referred to shows the rod or bar D attached at its upper end directly to the board A. This is the way I understand such rod or bar to have been attached in the construction used on your machine as testified to in your direct examination?

363 A. I had another iron on the board to which this one was connected to slide. I couldn't get the length of bar D exactly right, and made this iron to adjust it on. I would slide it in the iron to the right length and then make it tight with a bolt.

X Q. 65. Then are we to understand that the upper end or rod D was provided with more than one bolt hole?

A. I couldn't tell every hole that I bored—it was too long.

X Q. 66. What was the adjustment which you have referred to in your answer to X Q. 64 for?

A. So that I could get the right length of the rod to reach down to the butter-extension and keep that in the place where it ought to be.

X Q. 67. How could you get that "right length of the rod" without the rod having several holes in its upper end so as to permit it to be moved up or down and then fastened as found necessary?

A. I made an iron here with a slide. That iron with the slide was connected with the rod which reached down to the butter-ex-

tension, and then of course I slide that so as to get the right length and fasten with a bolt on the board.

X Q. 68. Then the rod D was extensible so as to fix its length?

A. The rod was not extensible, but by means of the slide I could make it longer or shorter.

X Q. 69. Will you please make a sketch illustrating the construction referred to.

(The witness proceeds to make such sketch on back of Defendants' Exhibit Heller's Sketch.)

364 A. Here is one that shows the device as well as I am able to draw it. It represents it correctly if any one understands it right

X Q. 70. As I understand this sketch D represents the same rod or bar as D in the Defendants' Exhibit Heller's Sketch, and *g* represents the slide-arm which you have referred to.

A. Yes, that is correct.

X Q. 71. How was the rod D attached to the slide *g* bolted to it?

A. I put rivets in at the time I made it.

(Counsel for defendants here shows witness the sketch and asks witness if he means that the rod D was riveted to the plate *g*. Witness replies "No," that the rod was fastened to the extension at the lower end loosely with a rivet, but was fastened to the plate *g* with a bolt.)

X Q. 72. How long was the slide-iron *g*?

A. I did not measure it. It was somewhere from four to seven inches.

X Q. 73. How long was the slot in it?

A. It was nearly the whole length, except at the end where the bolt or rivet went in—whatever you call it. The bolt or rivet went in where the rod was connected. The slide-iron might have been solid for an inch or an inch and a quarter at that end. I don't know exactly; the time is too long since I made it.

X Q. 74. How many butt-adjusters have you ever provided with extensions like the exhibit here before you?

A. I made this one.

X Q. 75. How long did you continue to use it after first putting it on your binder, at the time you made it?

A. Well, I don't know exactly how long we used it.

X Q. 76. About how long, to the best of your recollection, the first season?

365 A. After I got it on we used it the whole season.

X Q. 77. Without making any changes?

A. Well, no; I didn't make any changes on this.

X Q. 79. Did you ever use it after that season?

A. Well, we used it some the next year after, but I put my harvester to a header, and then we did not use it.

X Q. 80. Did it work well the next year?

A. The grain was too short to bind, so I took the binder off the

harvester and put an elevator onto the harvester and elevated the grain into a wagon.

X Q. 81. Then this adjuster and extension did not help you to handle that short grain?

A. Well, it was not in the extension, but the binder. The grain was too short to be bound with a binder at all.

X Q. 82. You have just stated off the record that the company sent Mr. Bishop out here that season. Please state all that passed or was said between you and him in reference to any of these matters?

A. We have talked these different things over. We talked about the spring compressor, and about that, too, but the main thing was about the spring compressor. He told me I should patent all them improvements, and then I told him I would rather leave it to the company than spend my money on it. He went off again and I thought the company would make those improvements. Later I found out that instead of their having that spring compressor, a man named Steward had a patent on it. Bishop told me I had better come to the shop in Beloit over winter time, but I did not go, because I got a felon on my finger, and my family did not like to have me go off.

366. X Q. 83. Did Bishop tell you that Steward had a patent on the spring compressor?

A. No; I found that out from Mr. Bullock, just this last spring, when he was here.

X Q. 84. Did the company for which you were agent ever adopt, or engage in the manufacture of your butt-adjuster extension, or wind board, about which you have been testifying?

A. Well, I guess it was in 1882, I explained to Dennett about that wind board, and they put on a sheet iron, hinged on, since that, without a spring. I explained him about the spring, but as they have got it on no spring is used—no spring is necessary. It works just as well without.

X Q. 85. It works as well without the spring as yours did with it?

A. Oh, no; I did not say that, that it works just as good as mine with a spring.

X Q. 86. As I understand you, you attempted to use this butter and extension in 1879, but that your binder was incapable of doing satisfactory work, even with them on, owing to the shortness of the grain that season, so that you then took them off along with the binder?

A. Yes.

X Q. 87. Have you ever used them, or done anything with them since?

A. Yes, I used them.

X Q. 89. When and to what extent?

A. Well, I don't know how long. We used them so long as we used the old binder.

X Q. 90. About how long was that?

367 A. I ain't sure how long. It was between the season of 1879 and 1880, when Mr. Dennett sent me another binder. I was corresponding with him at that time about that spring compressor. I wrote to him sooner about it. It was in the spring of 1879 when I wrote to him first about it. After Bishop was here, and I found they did not have a spring compressor on the new binder. Of course the old one did not have it.

X Q. 91. But you never used this butt-board extension after you got that new binder?

A. Yes; I used an extension, but not this any more. I made a new one.

X Q. 93. Exactly like this one?

A. No; this did not fit on the new binder.

X Q. 94. Was it connected to the butt-adjuster the same as this one?

A. Yes.

X Q. 95. Was it not fastened rigidly to the butt-adjuster so as to move with it?

A. It moved with the butt-adjuster; of course it did.

X Q. 96. Mr. Rubin has spoken of one of your butt-adjuster extensions, which I assume to be the one here referred to, as being connected to the adjuster in a stiff or rigid way. Was he correct in this?

A. Yes; I made a stiff one for the new binder. As I told you before, I did not have time to make one like this exhibit, but this one (referring to the exhibit) is the best.

X Q. 97. How long did you continue to use the stiff one made for your new binder, as above stated?

A. I don't know. We used the old one and the new one both together, the same season.

X Q. 98. What season was that?

368 A. I guess it was 1880.

X Q. 99. Are you quite sure that you used the old one—this exhibit—in 1880?

A. Well we used it anyway as long as we used the old binder.

X Q. 100. Did you use the new or stiff one right along after making it?

A. We used it some, but we threw the new binder aside and used the old one. The new binder did not work well.

X Q. 101. Did you put this stiff extension to the butt-adjuster on other binders than the new one which you received before the harvest of 1880?

A. Yes, I put it on some other machines. I made it in the short way, but I all the time told the people, "Next year we will have that kind" (referring to Exhibit Heller Butt-adjuster with Adjustable Extension) "on the binders."

X Q. 102. On how many other machines did you put the stiff extension?

A. Well, I could not tell that—maybe four to six—I don't know. I made it only for those who bothered me the most.

X Q. 103. You received still another new binder from the company in 1881, did you not?

A. Yes, I bought it from the company, exchanging the old one for the new one.

X Q. 104. Which kind of extension to the butt-adjuster did you put onto the new binder, last mentioned?

A. I don't know if we had any on that at all, on account that I expected the company to make it and have it on.

369 X Q. 106. Then, can you say whether you have ever used any at all since exchanging your old binder for a new one, before the harvest of 1881?

A. I couldn't tell that. I did not tend the machine. It was an old thing to me, and I did not attend to it, as I expected the company to put it on.

X Q. 107. How long did you use this wind board on your machine, as stated in your direct examination?

A. Why, we used it—I think we had it on our machine until we got that new machine that we got now—1884, I think.

X Q. 108. What has become of it?

A. I don't know.

X Q. 109. Have you tried to find it?

A. No, I never looked for it since we got the new machine.

X Q. 110. Have you not been asked to look for it, or yourself considered it advisable to look for it, for use in giving your testimony in this cause?

A. No.

X Q. 111. All that you have said about it, and this illustrative model offered in evidence as "Defendants' Exhibit Heller Wind Board and Spring," made in reference to it, has been said and made from memory merely?

A. Yes, I have not forgotten it. This model is only to show the principle of it—to show the form of spring—and is not just like it was. I sold that harvester cheap when I got the new machine, and that wind board may have gone along with it—I don't know. I explained it to Dennett, and I don't see why he did not put it on.

X Q. 112. What is Mr. Dennett's full name?

370 A. I think his name was Fred. He is the general agent for Wm. Deering & Co., in Philadelphia, or was until recently.

X Q. 113. As I understand your testimony, you never made any other wind board with a spring than the one which you claim to have used on your machine in 1878 and afterwards, and in reference to which this lath and wire model is made?

A. That is the only one I made with a spring.

X Q. 115. Did you make others without a spring, and if so, when, how many and for whom?

A. I did. I could not tell for whom at all, or how many. I was around helping as an expert, and helped the best I could. The farmer would sometimes ask what was the matter with the machine, saying that the heads would go down; and I would nail on a board in the right place. I would not have any springs or hinges with me in

the field there, so I would do the best I could. I may have fixed a dozen of them in this way. I don't know how many.

X Q. 116. Why did not your first binder work well without a spring compressor?

Objected to as not founded on the direct examination, and as immaterial.

A. The grain is sometimes damp, and the packer packs more in than the needle and compressor can press together. It sometimes gets more grain in a bundle than at other times; and of course if it is a solid compression, it won't give.

X Q. 117. Were you ever able to fasten any of your butt-adjuster extensions in such a way as to completely avoid the splitting of the board designated as "A in Defendants' Exhibit Heller Sketch"?

A. Of course I can; but as I had it there it was a board with already cracks in it.

371 X Q. 118. I have not asked whether you can, but whether you ever did?

A. Well, when I put it on it did not split then, it split afterwards. The board was defective.

X Q. 119. Was the splitting caused by the working of the machine?

A. Well, it split by the working of the machine on account that those old machines had more pressure and took more power than the new ones. The deck of the binder was different from the new ones.

X Q. 120. Where has this exhibit "Defendants' Exhibit Heller Butt-adjuster with Adjustable Extension" been since you discontinued using it several years ago?

A. I will have to ask my wife. I was hunting for it a long time, but she found it. There was snow on the ground at the time.

X Q. 121. At the time you were thus hunting for it, Bullock was out here to see you in reference to getting your testimony in this cause, was he not?

A. Well, he was not out on account of that. What he told me, he was on a visit to his brother or sister at McPherson, and then he spoke to me about those old improvements.

X Q. 122. What did he try to find these old things for? For use in the defense of this suit?

A. I did not know anything about this suit at that time. Bullock was here and talked with me about the things, and after he went back to Milwaukee, M. Schulte, superintendent of the Milwaukee Harvester Company wrote to me about them, asking me to look them up, and I did so. Bullock did not talk to me about any suit, but talked to me about the improvements.

372 X Q. 123. Then, if I understand you correctly, this exhibit, "Defendants' Exhibit Heller Butt-adjuster with Adjustable Extension" was thrown aside several years ago, and entirely lost sight of until last winter, when it was hunted up at the

instance of the superintendent of the Milwaukee Company, as above stated. Is all this correct?

A. Well, it is not correct. I did not lose sight of the principle. I thought all the time that Dennett or the Milwaukee Company would put one on their machines.

X Q. 124. But, so far as this particular piece of mechanism is concerned, you lost sight of it entirely for several years; and until hunted up as above stated. Is this correct?

A. Well, it is correct as to these pieces, because they did not fit on the new binders. That was the trouble.

X Q. 125. That is, you mean that the particular style of machine to which they were applicable, went out of use five or six years ago, and these pieces then becoming useless were thrown aside?

A. Yes, but I expected all the time the company would put it on their new binders.

X Q. 126. Where have these particular pieces been since you hunted them up last winter?

A. I sent them up to Mr. Schulte last winter, and I have not seen them since that time until they arrived here yesterday.

X Q. 127. The sketches which you made here yesterday and to-day have been made from memory merely, have they not?

A. Yes.

373 X Q. 128. And they are merely intended as general illustrations, and not as exact representations of the several features delineated therein, according to your recollection?

A. Yes.

X Q. 129. Have you ever taken any steps, or consulted with any of the officers of the Milwaukee Company, or with their counsel, in reference to applying for a patent on any of your improvements about which you have been testifying. If so, when, where, and with whom?

A. I did not talk with any of them about patents. I thought that those small things would not be worth patenting; but I explained it that I would like to have it on the machines.

X Q. 130. Did the company or any of its officers, or any one in any way connected with it, ever say anything to you about obtaining patents for these features?

A. No, except what Mr. Bishop told me, as I have already stated.

Adjourned to Saturday, September 4th, at 9 a. m.

SATURDAY, *September* 4, 1886—9 a. m.

Met pursuant to adjournment.

Present as before.

Cross-examination of GOTTLEIB HELLER continued by Mr. BANNING:

X Q. 131. Have you ever made application for a patent or patents on any improvement or improvements whatever relating to grain-binders or harvesters?

Objected to as having no foundation in the direct examination, and as irrelevant.

A. Not direct myself, that is not for my own benefit.

374 X Q. 132. For whose benefit have you made any application for a patent and how many have you made?

Same objection.

A. I made one only, for the benefit, of course, of the Dennett Harvesting Machine Company.

X Q. 133. The Dennett Company which you here refer to is the name which the predecessor of the present Milwaukee Harvester Company at one time had, so that the Milwaukee Company is now entitled to the benefit of the application made by you, as above mentioned?

Same objection.

A. Yes, by a certain contract with me.

X Q. 133½. When was that application made?

Same objection.

A. Some time in April, 1883, I guess.

X Q. 134. Through whom was the application made?

Same objection.

A. Through Stout & Underwood, of Milwaukee, of which firm Mr. Stout here present was a member. I showed the model to Mr. Dennett, who called Mr. Stout in and told him he should make application for a patent. That was the first time I saw Mr. Stout.

X Q. 135. Stout & Underwood were then and are now the attorneys of the company at present called the Milwaukee Harvester Company?

Same objection.

A. I understood they were then. I do not know whether they are now or not.

X Q. 137. Will you be kind enough to furnish the plaintiff, or some one of his attorneys, with a certified copy from the Patent Office of this application above referred to, including the

375 drawings thereof, particularly of the specification and drawings as originally filed, or give them an order to procure the same at their own expense.

Objected to as immaterial, and the witness is instructed that he may refuse to do so if he choos s, particularly if he thinks the Milwaukee Company have any rights in the premises, which are entitled to consideration.

A. I will leave that with the parties I gave it in the hands of. I made a contract with them, and have nothing to say about it.

By Mr. BANNING: Mr. Stout, of Stout & Underwood, attorneys for the Milwaukee Company, and the solicitors in charge of said application, being here present, ostensibly as one of the defendants' at-

torneys, I now request and call upon him to produce a copy of said application, to be offered in evidence and used in this cause as may appear necessary and proper; and I now desire an answer to this request.

By Mr. DYRENFORTH: I object to the introduction of the record named by any one, or in any manner into this suit until its pertinency has been shown.

By Mr. STOUT: I refuse to grant the request, as I am the *bona fide* attorney of the Winona harvester works in this suit, and as the production asked would be a betrayal of the confidence of the Milwaukee Harvester Company, by whom I was employed to present the application referred to.

(The witness having retired from the room at the request of Mr. Banning, the latter makes the following statement:)

376 The production of a copy of the application referred to being clearly proper for the purpose of impeaching the witness, I now give notice to defendants' counsel that the complainant will move at the hearing to suppress the entire deposition of Gottleib Heller unless the said application be produced in time to be referred to and used in a future cross-examination of this witness, or otherwise, in any proper manner, in connection with the taking of evidence in this cause.

By Mr. DYRENFORTH: It has not yet appeared that the production of the application referred to is "clearly proper" for the purpose of impeaching this witness, or for any other purpose. Moreover, even if it should turn out to be relevant or pertinent for any purpose, this would afford no grounds for a motion to strike out the deposition of this witness. If proper, counsel's remedy is to move in court in due season, for an order compelling the production.

By Mr. BANNING: Having requested the production of the document in question, and given notice of a motion to suppress the deposition of Mr. Heller unless it be produced, I now leave it for defendants' counsel to determine and take their own course; but in fairness think it proper to state that if they decline to produce the instrument called for or have the same produced, they must do so at their own risk, both as to the result of our motion to suppress, and as to inferences which may be drawn from their keeping evidence back.

By Mr. DYRENFORTH: You make us fairly shudder.

X Q. 138. You have this morning stated, off the record, that you would not like to produce your application for a patent already mentioned, for fear that Mr. Steward might take the invention, or words to this effect. In view of this, I will now ask you whether

377 it has not been heretofore impressed upon you that Mr. Steward had really gotten all the inventions mentioned in your testimony, to wit: the butter-extension; the wind board; and the spring compressor, in some way directly or indirectly from you?

Objected to as immaterial.

A. Well, of course I don't know which way he got those things—if he got it from his own mind, or if he got it from mine, while I was not particularly secret with these things. I have used it all public, and the things are so much like mine that I cannot help feeling suspicious.

X Q. 139. The board designated by the letter "A" on the sketch made by you, marked "Defendants' Exhibit Heller Sketch" was of the same kind and in the same position on your new binder bought in 1881, as on your binder of 1878 on which you claim to have used the butter and extension here before you marked "Defendants' Exhibit Heller Butt-adjuster with Adjustable Extension."

Same objection.

A. I do not know—I do not remember. I do not have any 1881 machine here now, so I cannot look and find out.

X Q. 140. Will you be kind enough to examine the board on your new machine, now standing outside here, and state what machine this one here referred to is, and whether the board "A" in question is not of the same kind and in the same position on this machine as it was on your 1878 machine, so often referred to?

Same objection.

(The witness goes out and examines the machine and then answers.)

378 A. It is an 1884 machine. The board referred to is about in the same position as in the 1878 machine, and is like the same board in my 1878 machine, except that this one is a good deal heavier and stronger.

X Q. 142. The board "A" on your 1878 machine standing out here which extends across the top of the "A frame" is exactly five inches wide and three-quarters of an inch thick, and the board on your 1884 machine referred to is exactly five and one-half inches wide and one and one-fourth inches thick. Is not this strictly correct as to both the boards referred to?

Same objection.

A. Yes, I have just measured both the boards, and the figures in your question are the ones which I gave you after measuring.

X Q. 143. Please look at the board across the "A frame" in the cut on page 11 of the Milwaukee Harvester Company's annual circular or catalogue, marked "A" in ink, and state whether or not it is the one which you have designated by the letter "A" in your sketch, and about which you have been above testifying?

A. Yes, I guess it is.

(The Milwaukee Harvester Company's circular or catalogue above referred to is marked "Milwaukee self-binder, 1886," for identification.)

X Q. 144. Where were you born, and how long have you lived in this country?

A. In Germany. I have lived in the United States a little over twenty-one years.

Redirect examination by Mr. DYRENFORTH:

R. D. Q. 145. In X Q. 57 you were asked whether the Exhibit Heller Butt-Adjuster with Adjustable Extension was the one
379 you put on the machine first in 1878, and you reply that you first put on a sheet iron, but that was not exactly an extension. Please explain what you meant by that answer.

A. I nailed a piece of sheet iron on the end of the adjuster to hold it up a little—I mean the short grain. I nailed it to the adjuster with two or three nails above and two or three below, and it was in the same position as the sheet-iron extension in this exhibit "Defendants' Exhibit Heller Butt-adjuster with Adjustable Extension," but was stiff, and in this respect was like the third one I made. It broke off and I threw it away and have never seen it since that I know of. It was this that led to the idea of the adjustable extension. I do not mean that it was not an extension, but that it was not a successful extension, so I made it and put it on at that time.

(Signed) GOTTLIEB HELLER.

Subscribed and sworn to before me this 4th day of Sept., 1886.

(Signed) W. E. A. MEEK,
[SEAL.] *Notary Public.*

Com. expires Feb. 16, 1887.

REINHARD RUBIN, the next witness in behalf of the defendants, being duly sworn, deposes and says, in answer to interrogatories by Mr. DYRENFORTH, as follows:

Q. 1. What is your name, age, residence and occupation?

A. My name is Reinhard Rubin; my age is thirty-eight years; residence, a farm in Jefferson township, Dickinson county, Kansas; and by occupation I am a farmer.

380 Q. 2. Were you an agent for any harvesting-machine company in 1878? If so, what was the company?

A. I was. The Beloit Harvester Co., Parker & Stone at that time.

Q. 3. Did you sell a Beloit harvester and binder to Mr. Gottlieb Heller, whose farm is in the vicinity of Dillon, Kansas, in the year 1878?

A. Yes, sir; on the 15th day of June of that year, as shown by my books.

Q. 4. Did you see that machine in use by Mr. Heller in his field in the harvest of 1878?

A. Yes, sir; I did.

Q. 5. At any time when you saw that machine in use in the harvest of 1878 was your attention called to, and did you see, any attachment which Mr. Heller had added to the machine? If so, please state what that attachment was, and what was its purpose.

A. When I came around once to see how the machine worked, Mr. George Heller, a son of Mr. Gottlieb Heller, was running the machine, but was just then stopping and oiling. I asked him how the machine worked. He said it worked pretty good, and then he said, "Did you see what my father made on the machine?" and he

called my attention to some improvement on the butt-adjuster. It was a piece put on the adjuster to straighten the butts and hold them so that they would not fall down.

Q. 6. Describe as nearly as you can remember it how that attachment was constructed?

A. It was a piece of sheet iron fastened to the adjuster in some way.

Q. 7. In what way was it fastened on the adjuster?

A. As well as I can remember—I don't really know how it was fastened to the adjuster.

381 Q. 8. What did this sheet-iron attachment do?

A. It was to straighten the butts so the butts wouldn't fall down.

Q. 9. Are you able to say whether the sheet-iron attachment was fastened to the adjuster so that it was stiff with the adjuster or not?

A. As much as I remember it was not stiff.

Q. 10. How was it?

A. It seemed to be a little loose.

Q. 11. Where was it loose?

A. As much as I remember it seemed to be at the place where it was made on the adjuster—fastened on the adjuster.

Q. 12. What kind of a butt-adjuster was on that machine?

A. The adjuster was about 18 inches long with a roller on one end and canvas around.

Q. 13. Was it a butt-adjuster with a canvas around it something like that?

(Witness is shown the adjuster portion of Defendants' Exhibit Heller's Butt-adjuster with Adjustable Extension.)

A. Yes.

Q. 14. On which end of the butt-adjuster was the roller?

A. On this end (referring to the lower end). There was a roller on both ends, of course.

Q. 15. Look at the Defendants' Exhibit Heller Butt-adjuster with Adjustable Extension now shown you as I have put it together, and state whether you have ever seen that particular device before, and if you think you have, state when and where, to the best of your belief, you saw it?

(Objected to as leading and as calling for what the witness "thinks merely.")

382 A. I saw this or something like that before—I saw this on a machine I sold Mr. Heller, as much as I can remember, in the latter part of June, 1878. The adjuster was on the machine and the extension was about in this shape (witness showing the extension slightly deflected out of a line with the adjuster). I do not know how the two were fastened together—don't remember any more.

Q. 16. Who called your attention to this device, if any one, on that occasion?

A. George Heller.

Q. 17. Then this is the occasion to which you have referred in a former answer?

A. Yes.

Q. 18. At the time you saw Mr. Heller's machine in the field with the extension to the butt-adjuster attached in the harvest of 1878, did you notice any other attachment to the binding part of the machine which had been added since the machine was sold by you to Mr. Heller. If you did, please state what that other attachment was?

A. I did so—I saw a board on the opposite side of the adjuster.

Q. 19. Was that board on the same side of the deck, or the adjuster?

A. No, it was on the opposite side.

Q. 20. What was the position of that board and what did it do if you know?

A. It was fastened on the opposite side of the deck and sloping (inward) toward the heads, to hold the heads up.

Q. 21. Did that board lie flat on the deck or was it on edge?

A. It was on edge.

383 Cross-examination by Mr. BANNING:

X Q. 22. How long and during what years were you agent for the Beloit Harvester Company, or Parker & Stone?

A. I was three years, during the years 1877, 1878 and 1879.

X Q 23. How many machines did you sell for them in each year?

A. As well as I remember, in 1877 I sold three or four harvesters; in 1878 I sold at least eight binders and some harvesters, and in 1879 I sold two harvesters and two binders, as much as I remember.

X Q. 24. Were you accustomed at that time to look closely after the machines you sold, to see how they operated, etc.?

A. I was, sir.

X Q. 25. How long would you continue to take that kind of interest in them?

A. Each season when I sold a machine I generally went around three or four times to see how it worked. I did not go to see machines sold the season before, unless I was called on.

X Q. 26. Then I suppose you saw the machine you sold to Mr. Heller at least three or four times during the season you sold it?

A. I saw it about three times, I can say.

X Q. 27. How many times did you see the "butt-adjuster extension and wind board on it," referred to in your direct examination?

A. I saw it two times.

X Q. 28. When did you first see either of these additions or features?

384 A. In the harvest of 1878, in the latter part of June—the second time when I came to look at the machine, which was probably about twelve days after I sold the machine, and had not previously cut very much.

X Q. 29. How long did he afterwards continue to use the machine in the same harvest or season?

A. He used it the day I was here and I suppose used it until he finished his harvest, about three weeks or more, I suppose.

X Q. 30. Did you examine the butt-adjuster extension which you say you saw on the Heller machine carefully enough to understand fully its construction and manner of operation?

A. I looked at the adjuster very closely.

X Q. 31. But as I understand you, you say that you do not remember exactly how the extension was attached to the adjuster?

A. I do not remember any more at the present time.

X Q. 32. Did you see the adjuster or its extension moved at that time, or at any other time?

A. I did, sir.

X Q. 33. Can you tell exactly how it moved? I am now speaking of this particular adjuster and extension here in the room before you, and which has been offered in evidence as "Defendants' Exhibit Heller Butt-adjuster with Adjustable Extension."

A. I can show you how it moved—when the adjuster would be thrown with the lower roller more toward the grain the extension would keep straight toward the butts.

X Q. 34. How do you remember that?

385 A. Why, George showed me, and while we had generally trouble with the wheat, the butts generally fell down there, the spring was not strong enough to hold the butts on the binder—this kept the butts in shape. It was a piece of improvement.

X Q. 35. How long did you watch the machine in operation at that time, if at all?

A. When George started up he made about a round, and I watched the machine to see it work. Then I went off to see about another, as much as I remember.

X Q. 36. Do you remember whether you actually saw the butt-adjuster and extension moved while you were following the machine during that round, or are your statements as to how it worked made from what George told you merely?

A. Well, when I went around I saw the adjuster on the machine, and saw that it kept the butts in place.

X Q. 37. But your statements in reference to the extension keeping straight while the lower end of the adjuster was moved inward are made from what George told you, as I understand you?

Objected to, since witness has distinctly stated that George Heller not only told him, but also showed him how the device worked.

Counsel for complainant protests against this way of making suggestions to the witness.

A. Yes, some, and while I was going round I saw that when the harvester would shake, the adjuster would move in or out a little, and this extension would keep straight.

X Q. 38. You say you saw this adjuster with its extension twice during that season. Do you mean that you saw it twice on the same day, or that you saw it on two different days?

386 A. I saw it on two different days. I don't remember any more how many days there were between; the first time I saw the machine with these improvements on I saw it in the field; the second time I saw it in the yard. As much as I remember he was waiting for his oats to get ripe at that time. I only saw it working once.

X Q. 39. Did you consider this extension attached to the butt-adjuster as a good thing?

A. At that time I did.

X Q. 40. Have you since changed your mind in this respect?

A. No, sir; if they used that machine now I would think it would be a good improvement.

X Q. 41. Did you try to have that kind of an improvement put on any of the other machines sold by you?

A. That year it was too late to put any of the improvements on, and I did not know whether I would be agent next year. I did not try myself. I told Heller to write to the company about having the improvements put on the machine.

X Q. 42. Are you not aware that Heller made many different forms or experiments in reference to this butt-board extension feature?

A. Well, this is the one I saw on.

X Q. 43. Please answer my question.

A. He told me he did make one more, and I saw it too.

X Q. 44. When did he make it?

A. He made it the same year.

X Q. 45. Before or after he made the one here in evidence and now in the room before you?

387 A. I saw this one on the machine, and the other I have not seen on the machine. As much as I remember he made it after he made this one. He surely could not have made it before, for I saw this on the machine pretty soon after he commenced cutting grain.

X Q. 46. When did he tell you about this second one, and how it was constructed?

A. He told me that same harvest, toward the latter part of the harvest, I think, as much as I remember. It was a piece of sheet iron and screwed on the frame of the adjuster, as much as I remember. That is what he told me. I saw it myself some time after, and that is the way I remember it.

X Q. 47. Was that extension intended to remain straight while the lower end of the adjuster was moved, or not?

A. I have not seen it on the machine.

X Q. 48. What did you understand from seeing it, as mentioned in your answer to cross-question 46, and what did Heller tell you about it?

A. Why, I have not seen it on the machine, and Heller told me it was intended to keep the butts straight.

X Q. 49. From your seeing it off the machine and from what Heller told you about it, did you understand that it was intended to operate in the same way as this exhibit here before you, particu-

larly with reference to the extension part keeping straight while the lower end of the adjuster was being moved?

A. No, sir. It could not work in the same way. The extension was screwed on the adjuster stiff and had to move with it.

X Q. 50. The purpose and object was the same, however, was it not?

388 A. Yes, sir.

X Q. 51. Do you know, or did Heller tell you how long he used that second form in the harvest of that year?

A. I don't remember whether he told me, and I don't know whether he used it. I don't remember any more.

X Q. 52. Will you be kind enough to describe exactly how the extension was kept straight or square with the butts in this adjuster and extension here before you.

A. Well, I have seen this on the machine, and this iron or extension kept straight with the butts. I can't describe how it was fastened on any more.

X Q. 53. And so you do not pretend to remember the details of its construction—how it was fastened on, or similar matters?

A. Well, I have seen this on the machine and how it worked. I do not remember how it was fastened on or other details, except that it would bend there when the adjuster moved.

X Q. 54. Have you ever seen this exhibit now before you since 1878, and before the beginning of the taking of testimony here yesterday?

A. No, sir, I have not.

X Q. 55. Then how do you know that this is the same adjuster and extension that you saw on Heller's machine in 1878?

A. Well, I saw this or something like it on Heller's machine. This looks like it.

X Q. 56. Then, as a matter of fact, you do not know whether you ever saw this particular exhibit before yesterday or not?

A. As much as I remember, this is the same one, or it was just like it.

389 X Q. 57. Do you remember how the wind board which you have referred to was secured or held in place on the Heller machine?

A. Why, it was fastened on the opposite side from the adjuster in some way, but I don't remember how it was fastened.

X Q. 58. Do you remember whether it had any kind of a spring about it or not?

A. I don't know whether it had. I don't remember.

X Q. 59. Have you a self-binder on your own farm?

A. I have, sir.

X Q. 60. What kind?

A. I have a McCormick.

X Q. 61. Has your McCormick binder a board opposite the adjuster which operates to retard or hold the heads back?

Objected to as having no foundation in the direct examination, and as going into matters which are not proper at this stage of the case.

A. It has.

X Q. 62. Please describe the operation of that board—how secured—whether movable or not, and what moves it, etc.

Same objection.

A. Why, it is hung on hinges to the harvester, as much as I remember, and is moved by a spring. This spring moves it toward the heads and the heads move it back, while the machine is at work.

X Q. 63. Can you swear that the wind board, that you have referred to, and which you say you saw on the Heller machine in 1878 was like the board on your McCormick binder, either in construction or operation?

390 Same objection.

A. No, sir; I cannot swear that; but the Heller board answered the same purpose as the board on my machine.

X Q. 65. You have stated that you sold eight binders in 1878. How did those machines work—satisfactorily or otherwise?

Objected to as immaterial.

A. For those men who understood machinery they worked very well.

X Q. 67. I assume, of course, that they were sold to give satisfaction, and that if they failed to give satisfaction they were to be returned.

Same objection.

A. Yes, sir; they were sold that way.

X Q. 68. Did any of them have to be returned?

Same objection.

A. There was not one returned except one which had not been set up. I could not get around to set it up in time. As long as I was agent there was not one returned except that.

X Q. 69. Did you have any considerable trouble with any of them?

Same objection.

A. I did with some. Some men did not know how to run a machine, and had poor twine. The twine was a good deal to blame.

X Q. 70. Did you get any one to go around with you, or for you, to look after those machines, or help in starting or working them?

A. The company sent out Mr. Bishop to help me, and then Mr. Bishop told Mr. Heller that if I needed him he should once in awhile help me and see after the machines.

391 X Q. 71. Did Mr. Heller do so?

A. He did so, yes, sir, sometimes; I don't remember any more how many times. He went to those parties who called on him.

X Q. 72. Do you know what Mr. Heller did to any of those machines?

A. I don't know. Sometimes a knotter would be out of order and he would fix it up for them, or other parts would be out of order or would break and he would fix on the pieces.

X Q. 73. Do you know whether he ever put onto any of them any wind-board or butt-adjuster extension, any of the kind you have been testifying about here today?

Objected to as having no foundation in the direct examination.

A. I don't know whether he did. In 1878 he did not do much work for the company. In 1879 he did more and was called on by different parties on old machines that I sold the year before and even on one that I sold in 1879.

X Q. 74. In 1878 you were especially anxious to have your machines prove satisfactory, so that you would get your commissions and also be able to keep the agency for the next year?

A. I was anxious to have the machines work satisfactorily, but I did not care for the commissions or the agency. The commissions were small enough.

X Q. 75. Are you in any way related to Mr. Heller?

A. No.

X Q. 76. But you are on very friendly relations with him, and have been for a good many years?

A. For some years.

392 X Q. 77. Do you consider that you have had as good an opportunity as anybody, and as much interest as anybody to know about his improvements on the grain-binder, in reference to which you have been testifying?

A. I did not have the opportunity as some others had, and didn't have any interest since I quit the business.

X Q. 78. You have talked this whole matter over with him recently?

A. I talked with him last spring once, but not this whole matter He asked me last spring once if I remembered about this (indicating the butt-adjuster and extension).

X Q. 79. Did he not then also ask you to give an affidavit in reference to this matter?

A. Yes, sir; he did.

X Q. 80. Who was with him at that time?

A. No one but Mr. Meek, the notary.

X Q. 81. Did you not at that or some other time also see and talk with Mr. Stout, attorney for the Milwaukee Harvesting Machine Company?

A. I have seen Mr. Stout yesterday for the first time.

X Q. 82. What did Mr. Heller tell you he wanted your affidavit for?

A. He wanted to send it to the Milwaukee Harvesting Company, which I understood to be the successor of the Beloit Company.

Redirect examination by Mr. DYRENFORTH:

R. D. Q. 83. Have you any interest, directly or indirectly, in the result of this suit?

A. I have none.

REINHARD RUBIN.

393 Subscribed and sworn to before me, a notary public, September 3rd, 1886.

W. E. A. MEEK,
*Notary Public.*

Com. expires Feb. 16, 1887.

GEORGE HELLER, the next witness on behalf of the defendants, being duly sworn, deposes and says in answer to interrogatories propounded by Mr. DYRENFORTH, as follows:

Q. 1. What is your name, age, residence and occupation?

A. My name is George Heller; reside on a farm in Jefferson township, Dickinson county, Kansas; a farmer and 26 years old.

Q. 2. You are a son of Gottlieb Heller?

A. Yes, sir.

Q. 3. Did you work on your father's farm in the year 1878?

A. Yes, sir.

Q. 4. Do you remember the fact that your father bought a self-binding harvester in the year 1878, and if so, do you remember whether that binder had on it a butt-adjuster consisting of a swinging frame secured at the front edge of the deck and carrying a roller at each end and a traveling apron?

A. Yes, sir.

Q. 5. Did you use that harvester and binder in the harvest of 1878?

A. I and father did; both of us.

Q. 6. Do you remember whether any attachment of any kind was added to the butt-adjuster by your father at that time? If you do, please state what the attachment was, what it was for, and when it was put on, as nearly as you can remember.

394 A. Yes, sir; I remember an attachment was put on by my father. It was a piece of sheet iron fastened with a bolt and a piece of wrought iron riveted onto it. It was fastened to the lower end of the butt-adjuster. It was to keep the butts of the grain from slipping out from under the butt-adjuster—to keep the grain straight and was put on in the year 1878, after we had cut about two, three or four days with the machine.

Q. 7. How was the extension secured to the lower end of the butt-adjuster?

A. By a kind of a screw or bolt.

Q. 8. Was it fastened so that it was stiff with the butt-adjuster, and if not, how was it fastened?

Objected to as leading.

Question withdrawn.

Q. 9. How was it fastened to the butt-adjuster; that is to say, what would the sheet-iron extension do when the butt-adjuster was moved?

A. It was fastened with a bolt or screw to the bottom of the adjuster, and when the adjuster was moved it would move, too.

Q. 10. Would it move in just the same way as the butt-adjuster, and if not, how would it move?

A. It would move the same way in one way and in another way; when the butt-adjuster would be slanting it would be kind of straight down.

Q. 11. How was it connected if you know, so that when the butt-adjuster would be moved and be slanting it would be straight down?

A. Well, I can't tell exactly how it was fastened, but it was fastened; one was fastened by a kind of a wrought-iron rod to the top of the machine, and the rod had either a slot or some holes
395 in it; I don't know which. The holes or slots, whichever it was, I suppose was to fasten it to the top board of the machine.

Q. 12. To what was the lower end of the rod fastened, if you remember?

A. It was fastened to the other wrought iron.

Q. 13. You mean it was fastened to the wrought iron which you have referred to as being riveted to the sheet iron, do you not?

A. Yes, sir. That is, on one of them that he made, and the other didn't have any wrought iron to it; that is, to run to the top of the machine.

Q. 14. Look at this exhibit and state what it is, if you know.

(Counsel shows witness Defendants' Exhibit Heller's Butt-adjuster with Adjustable Extension.)

A. This here sheet-iron extension is the one he put on in 1878, because this piece of sheet iron is a piece off our old Kirby self-rake.

Q. 15. Do you recognize that as being the device or just like the device which was used on your binder in the harvest of 1878?

A. Yes, sir.

Q. 16. Do you believe it to be the very same one that was applied to and used on your binder in the harvest of 1878?

A. Yes, sir.

Q. 17. Do you find as a part of that device the rod which connected the wrought iron on the sheet iron to the top of the machine?

A. No, sir; that's missing.

Q. 18. How long was that particular exhibit used on your father's machine, as nearly as you can remember?

A. It was used from the time it was put on that season
396 till the season was out, and I used it the next season about a half day—somewhere similar to that—while father was getting the header attachment done. The grain proved too short to bind. It was not more than a foot high.

Q. 20. Was it used openly in the field so that other people could

see it who wanted to, and did other people, in fact, see it? I refer to the attachment which your father put on as seen in this exhibit; which you have identified.

A. Yes, sir.

Q. 21. Do you know whether among others Mr. Reinhard Rubin ever saw this attachment in the field in the harvest of 1878?

A. Reinhard Rubin saw it and other folks saw it.

Q. 22. Please state what you can remember of the occasion when Reinhard Rubin saw it.

A. He was the agent for the machine. He sold the machine to us. Then he came around to see how the machine worked. I was oiling and he asked me how it worked. Told him it worked pretty good; at least I think that's what I told him. Then I showed him what pa put on. I showed him that sheet iron; believe that's all I told him.

Q. 23. When was this, as nearly as you can remember?

A. It was in the harvest of 1878—about the middle of the harvest, when I was cutting on our place.

Q. 24. Do you remember any other attachment which your father put on that first machine? I mean any attachment upon the opposite side of the deck from the butt-adjuster. If so, state as nearly as you can what that attachment was, and what it was for.

397 A. He put on a board with a hinge hanging down this way. (The witness illustrates by means of a sheet of paper placed edgeways and diagonally on the notary's table.) It was fastened with a hinge either to the top of the machine or the binder, I don't know which, the edge resting on the deck of the binder.

Q. 25. If that board, as you remember it, was held in position by anything, please state what it was.

A. It was held forward with a spring.

Q. 26. Did you run the machine yourself with the board on it; if so, to what extent?

A. Yes; I ran it part of the time. I couldn't tell how long. I ran it part of the time on Rubin's and part on our own place. I didn't run the binder on Tober's place. I was driving the oxen there. We were running the binder there with oxen, and my father rode on the machine and I drove.

Q. 27. What was the purpose of that board with the spring and hinges?

A. It was to keep the heads from falling down too fast—the heads of the grain.

Q. 28. How long did that board with the hinges and spring remain on the machine, if you know?

A. Don't know exactly how long. It stayed there at least the greatest part of the first harvest, I know, but it broke off once and I don't know whether it was put on again or not.

Q. 29. Was it used openly in the field where others could see it if they wanted to, and did others in fact see it?

A. Others could see it. I don't remember whether anybody in particular saw it or not. I saw it frequently in use.

397¼ Q. 30. Your father saw it in use frequently, did he not?

A. Yes, sir.

Q. 31. Was the harvest of 1878 the only time when that wind board that you have just referred to was used on your father's machine?

A. No, sir; it was used about a half a day the second year while the binder was used.

Q. 32. What became of it then, if you know?

A. It was taken off with the binder. It was put away with the binder, and I don't know what became of it?

Q. 33. Do you know whether your father ever attached any rigid or stiff extension to the butt-adjuster or any of his binders; if so, when was it?

A. He put one onto the 1878 binder and tried it for a day or two, and then put this other one on (referring to Exhibit Heller Butt-adjuster with Adjustable Extension), and he afterwards put a stiff one on that second binder we got. I could not tell exactly what year that was—two years afterwards, I think. On reflection, I know it was the third harvest.

Cross-examination by Mr. BANNING:

X Q. 34. You do not claim to remember the exact way in which the extension to the butt-adjuster forming a part of Exhibit Heller Butt-adjuster with Adjustable Extension was attached on your father's 1878 binder?

A. As I said before, it was either attached with a bolt or a screw to the adjuster. That is all I can say about it, I guess.

X Q. 35. The stiff extensions referred to in your answer to

397½ Q. 33 were all attached and used in the same way—that is, the last ones in the same way as the first one, I suppose?

A. The very first one he put on and just used a day or two was just put on with nails. The next stiff one was put on with screws or bolts, I don't remember which, on the top or side of the adjuster.

X Q. 36. But the two, being stiff, operated it in the same way?

A. Yes, sir; that is the two stiff ones.

X Q. 37. And one as good as the other?

A. No, sir; the one that was nailed on came loose part of the time because nails don't stick in wood as well as bolts or screws.

X Q. 38. When Mr. Steward called on you and talked with you first about this matter last Tuesday, did you not tell him that your father's extension to the butt-adjuster always swung with the adjuster?

A. Of course it is bound to swing with the lower end of the adjuster.

X Q. 39. Did you tell him at that time that your father ever put on an extension that would keep straight while the adjuster was being moved?

A. He did not ask me whether it would keep straight. I told

him it would move with the adjuster just as that would move and hang down. I also told him that I did not know exactly how it worked, until I could study over it or see the old one.

X Q. 40. Do you remember saying to him that it would "hang down"?

A. Yes, sir; I used those words, or some similar ones.

398 X Q. 41. Did Mr. Steward at that time make a pencil sketch, in a little blank book, of the adjuster and extension used on your father's machine in 1878, as you explained and described it to him?

A. He was marking around in his book, yes.

X Q. 42. He rubbed out marks and put in marks in making that sketch, exactly as you instructed him, did he not?

A. He did not show his marks to me exactly that he made in the book at all.

X Q. 43. Do you mean to say that he did not make that sketch openly before you in every respect in accordance with your suggestions?

A. No, he had the book in his hand like this, and was marking. (Witness holds his own hand up toward and before him.) Then he showed it to me and asked me if that was about it, and I said I didn't know. I didn't understand much about drawing. I did not pay extra attention to it, because I do not think I had any use to. He asked me first to make a drawing of it myself, but I told him that I didn't know anything about making drawings—he handed me the book and wanted me to draw it.

X Q. 44. Would you recognize that sketch if it were shown to you?

A. Well, I think I could tell it pretty near; I would not be certain.

X Q. 45. Please look at this sketch which I now hand you, and state whether it is the one Mr. Steward made at that time?

A. I think that is pretty near like the one he made, and then I told him that was something similar to the stiff one.

The sketch referred to is marked "Steward Sketch, Aug. 31, 1886, P. C. D." for identification.

399 X Q. 46. Referring to the wind board, did not your father put on several wind boards, which he nailed on and made fast, either on his own or other people's machines?

A. After the first one was taken off—that is the one with the spring on our machine—he put some on our machine with nails, and some on the other machines also. Some were wooden boards, and nailed on with leather hinges, and some were tin nailed on without hinges. The tin ones were nailed on so that they would slope toward the front end of the binder, and the tin would spring and give.

X Q. 47. Whom have you talked this whole matter over with recently—since last Tuesday?

A. I have talked with Mr. Dyrenforth. I do not think I have talked with Mr. Stout about it. I have talked with my father some.

X Q. 48. Mr. Stout staid all night at your father's house last night, while the rest of us went six miles to a hotel—you driving us there, and Mr. Stout going alone, and then coming back with you?

A. Yes, sir.

(Signed) GEORGE HELLER.

Subscribed and sworn to before me this 4th day of September, 1886.

(Signed) W. E. A. MEEK,
*Notary Public.*

Com. expires Feb. 16, 1887.

*Stipulation.*

It is stipulated, that if recalled as a witness, Gottlieb Heller would swear that since the close of his deposition he has,
400 & 401 at the request of Mr. Dyrenforth, of counsel for defendants, made a search about his premises for the wind board with a spring, which was on his 1878 binder, and which he has referred to in his testimony, but that he has been unable to find it, and does not believe that it can now be found.

(Signed) W. E. A. MEEK,
*Notary Public.*

402 EDWIN D. BISHOP, being duly sworn, deposes and says, in answer to questions by Mr. DYRENFORTH, as follows:

403 Q. 1. What is your name, age, residence and occupation?

A. My name is Edwin D. Bishop; age, 56 years; residence, Charles City, Iowa, and by occupation I am a farmer.

Q. 2. In what business were you engaged in the year 1878?

A. I was at work for the Parker & Stone Reaper Co. from about the first of May until after the fair at St. Paul, about October 1st. The balance of the time I do not remember, but was at home attending to my home matters.

Q. 3. Were you in the employ of Parker & Stone in the year 1879 also?

A. No, sir; not directly. I did a little work for them for other parties.

Q. 4. Are you acquainted with Gottlieb Heller, residing on a farm in the neighborhood of Dillon, in Dickinson county, Kansas? If you are, please state when you first made his acquaintance.

A. I am, and I made his acquaintance some time in June, 1878.

Q. 5. Please relate the circumstances under which you made the acquaintance of Gottlieb Heller.

A. I was doing the expert work for the harvester and binder of the Parker & Stone Reaper Co. I went to Mr. Heller's place for the purpose of setting up and educating him in the running of a binder, he having bought one from Rubin Bros., of Abilene. I think that was the name of the firm.

Q. 6. State whether the machine which had been sold Mr. Heller was provided with a butt-adjuster consisting of a traveling
404 apron mounted on edge upon a frame over the deck of the machine, the apron being provided with transverse slats for catching and conveying the butts of the grain, and run by suitable gearing.

A. He was provided with such, being the same as the machine was provided with that year.

Q. 7. You have stated that you went to Mr. Heller's farm some time in the month of June, 1878. Please relate as nearly as you can remember it, what occurred on the occasion of that visit with reference to this machine.

A. I found Mr. Heller and his son, I think it was, in the field, as I remember, of about 20 acres of wheat nearly all cut. I expressed my surprise at his success, and his answer was that he had no use for experts, that he had taken the binder all to pieces, put it together again, that he understood every principle about it and the intentions of the inventor. That I could go right along to some one that needed me. He also remarked that he had already made some improvements and called my attention to the adjuster and the extension that he had made thereto. I also think, but am not positive, that he had fastened a piece of sheet iron onto the sheet-iron deflector so that it filled the space above the binder as low as the spring-wire bar. This improvement on the adjuster was a piece of sheet iron fastened to the lower end rigidly, as I remember it, about in such position that the adjuster would be in an angle of forty-five degrees to the butts of falling grain, and the extension, or improvement as I have termed it, would be perpendicular to the butts of the grain. That is to say, the obtuse angle formed by the butt-adjuster and the extension was an angle of somewhere about one hundred and thirty-five degrees. My answer to Mr. Heller
405 was that I did not care how much he improved it, if he could only make it work, and I then drove onto another machine.

Q. 8. State whether or not you visited the farm of Gottlieb Heller on any occasion subsequent to the one you have referred to, and if you did, please state when it was, and what, if anything, occurred concerning Heller's attachment to the butt-adjuster on the occasion of this second visit.

A. In the season of 1879 I worked for Fuller, Johnson & Co. They ordered me in June of that year to Abilene, Kansas, to do some work for Parker & Dennett, successors to the Parker & Stone Reaper Co. This work consisted of finding some man and instructing him how to put on some improvements to the Parker & Stone machines of 1878. My experience with Mr. Heller the year before satisfied me that he was the man I wanted. I went to his farm for the purpose of engaging him if I could. I asked him about his success the year before in running his machine and how his invention worked. He said he had cut a large harvest, both of his own and of a brother-in-law's, I think in the neighborhood of 200 acres; that he used the invention that I saw, and another one for the same

purpose that he made after I was there, in cutting nearly all of this harvest. He went out to find his last attachment, but I was in such a hurry that I did not stop to see it, but told him he could tell me all about it the next day, when he had agreed to meet me at Abilene and drive me over to Salina.

Q. 9. Was the invention referred to by you and Mr. Heller in that conversation the extension to the butt-adjuster?

406 A. It was the invention referred to by me.

Q. 10. State whether you met Mr. Heller the next day according to appointment, and whether any conversation occurred between you relating to his improvements upon his original extension to the butt-adjuster, and if so, please give the substance of that conversation as nearly as you can remember it.

A. I met Mr. Heller and he took me in his wagon and drove me to Salina, occupying the larger part of the day. He talked a great deal about his invention, and the most that I can remember is that I advised him to take out a patent, and also advised him to go to Parker & Dennett, to try to get work in the shop, and perhaps they would take hold of the matter with him.

Q. 11. If he gave you any description at that time of the construction and mode of operation of the improvement which he had made, after your first visit, upon his original butter-extension, please state what that description was as nearly as you can remember it.

A. All I can remember definitely is that it was an improvement to the adjuster, and from my seeing the original arrangement the year before, the improvement was in that line.

Q. 12. Did he not describe to you how this second extension to the butt-adjuster would act when the butt-adjuster was moved?

A. I have the impression that he did talk about it nearly all day, but I can't remember it accurately enough to describe it, but have the impression that it was so arranged that when the adjuster was moved in any position, the improvement or extension would stand perpendicular to the butts of the grain.

Q. 13. I understand you to say that you cannot now

407 & 408 recollect his description of the mechanism by which this result you have named was effected. Is that correct?

A. Yes, but with the understanding that the latter part of the last answer is an account of something indistinct in my memory, and is simply the dim recollection that one will have after the lapse of a number of years.

Cross-examination waived.

EDWIN D. BISHOP.

409 In the Circuit Court of the United States for the District of Minnesota.

WILLIAM DEERING
*vs.*
WINONA HARVESTER WORKS *et al.*

WILLIAM DEERING
*vs.*
THE MCCORMICK HARVESTING MACHINE COMPANY.

In Equity.

It is hereby stipulated that any evidence taken, or exhibits offered, in either of the above-entitled causes, may be used so far as relevant in the other, with the same effect as if taken especially in each cause.

(Signed) BANNING & BANNING,
*Solicitors for Compl't.*
PARKINSON & PARKINSON,
*Sol'rs for McCormick H. M. Co.*
DYRENFORTH & DYRENFORTH,
*Solicitors for Winona Harvester Works et al.*

Examination of witness on behalf of the defendants under the 67th rule, in equity, as amended.

410 Present: Thomas Banning, Esq., for the complainant, and P. C. Dyrenforth and J. G. Parkinson for the defendants.

By request of the parties, it is ordered that these depositions be taken by question and answer.

HENRY B. RENWICK, a witness produced on behalf of the defendants, being first duly sworn, deposeth and saith, in answer to interrogatories propounded to him by Jos. G. PARKINSON, Esq., of counsel for the defendants, as follows:

Q. 1. State your name, age, residence and occupation.

A. Henry B. Renwick; age, 69; I reside in the city of New York and am by profession a civil and mechanical engineer.

Counsel for defendants here offers in evidence copy of letters patent of the United States, granted to Watson & Renwick Dec. 6, 1853, No. 9930, which is received in evidence and marked "Defendants' Exhibit Watson & Renwick Patent."

Also copy of letters patent of the United States, granted to S. D. Carpenter, No. 85210, which is marked "Defendants' Exhibit Carpenter Patent."

Also copy of letters patent of the United States, granted to J. H. Jones Feb. 23, 1869, No. 89263, which is received and marked "Defendants' Exhibit Jones Patent."

Also copy of letters patent of the United States, granted to Ole O. Storle June 15, 1869, No. 91282, which is received in evidence and marked "Defendants' Exhibit Storle Patent."

Also copy of letters patent of the United States, granted to M. L. Gorham Feb. 9, 1875, No. 159,506, which is received in evidence and marked "Defendants' Exhibit Gorham Patent."

411 Also copy of letters patent of the United States, granted to J. H. Whitney Sept. 28, 1875, No. 168,120, which is received and marked "Defendants' Exhibit Whitney Patent."

Also copy of letters patent of the United States, granted to Thadeus Fowler Aug. 29, 1876, No. 181,664, which is received in evidence and marked "Defendants' Exhibit Fowler Patent."

Also copy of letters patent of the United States, granted to John F. Appleby Feb. 18, 1879, No. 212,420, which is received in evidence and marked "Defendants' Exhibit Appleby Patent."

Also copy of letters patent of the United States, granted to Wm. L. Williams May 11, 1869, No. 89906, which is received in evidence and marked "Defendants' Exhibit Williams Patent."

Also copy of letters patent of the United States, granted to John H. Elward July 6, 1875, No. 165,316, which is received in evidence and marked "Defendants' Exhibit Elward Patent."

Also copy of letters patent of the United States, granted to John H. Elward May 9, 1876, No. 177,231, which is received in evidence and marked "Defendants' Exhibit Elward Patent."

Also copy of letters patent of the United States, granted to Geo. F. Green, M'ch 6, 1877, No. 188,125, which is received in evidence and marked "Defendants' Exhibit Green Patent."

Also copy of letters patent of the United States, granted to Edwin Chapman June 19, 1877, No. 192,150, which is received in evidence and marked "Defendants' Exhibit Chapman Patent."

412 Also copy of letters patent of the United States granted to Edwin Chapman June 19, 1877, No. 192,151, which is received in evidence and marked "Defendants' Exhibit Chapman Patent."

Also copy of letters patent of the United States, granted to Theodore Palmer Jan. 13, 1863, No. 37408, which is received in evidence and marked "Defendants' Exhibit Palmer Patent."

Also copy of letters patent of the United States, granted to S. D. Locke Dec. 19, 1865, No. 51599, which is received in evidence and marked "Defendants' Exhibit Locke Patent."

Also copy of letters patent of the United States, granted to E. S. Pierce March 3, 1868, No. 75051, which is received in evidence and marked "Defendants' Exhibit Pierce Patent."

Also copy of letters patent of the United States, granted to S. D. Locke Dec. 7, 1869, No. 97531, which is received in evidence and marked "Defendants' Exhibit Locke Patent."

Also copy of letters patent of the United States, granted to S. D. Locke Dec. 7, 1869, No. 97533, which is received in evidence and marked "Defendants' Exhibit Locke Patent."

Also copy of letters patent of the United States, granted to J. E. Buxton June 20, 1876, No. 178,993, which is received in evidence and marked "Defendants' Exhibit Buxton Patent."

Also copy of letters patent of the United States, granted to Wm.

R. Baker May 22, 1877, No. 191,096, which is received in evidence and marked "Defendants' Exhibit Baker Patent."

Also copy of letters patent of the United States granted to
413 J. E. Buxton June 12, 1877, No. 191,929, which is received in evidence and marked "Defendants' Exhibit Buxton Patent."

Also copy of letters patent of the United States, granted to Lambert Erpelding June 18, 1878, No. 205,067, which is received in evidence and marked "Defendants' Exhibit Erpelding Patent."

Also copy of letters patent of the United States, granted to Wm. R. Baker and H. E. Pridmore April 6, 1886, No. 339,518, which is received in evidence and marked "Defendants' Exhibit Baker & Pridmore Patent."

Also copy of letters patent of the United States, granted to Daniel McPherson Sept. 27, 1870, No. 107,797, which is received in evidence and marked "Defendants' Exhibit McPherson Patent."

Also copy of letters patent of the United States, granted to Harrah & Jones June 30, 1863, No. 39096, which is received in evidence and marked "Defendants' Exhibit Harrah & Jones Patent."

Also copy of letters patent of the United States, granted to Chas. Jewell, April 21, 1874, No. 150,050, which is received in evidence and marked "Defendants' Exhibit Jewett Patent."

Also copy of letters patent of the United States, granted to J. E. Buxton Oct. 18, 1881, No. 248,401, which is received in evidence and marked "Defendants' Exhibit Buxton Patent."

Also copy of reissued letters patent of the United States, granted to John H. Elward April 27, 1880, No. 9179, which is received in evidence and marked "Defendants' Exhibit Elward Patent."

Also copy of letters patent of the United States, granted to
414 Bullock & Appleby October 31, 1882, No. 266,949, which is received in evidence and marked "Defendants' Exhibit Bullock & Appleby Patent."

Also copy of letters patent of the United States, granted to Geo. Esterly August 1st, 1882, No. 266,026, which is received in evidence and marked "Defendants' Exhibit Esterly Patent."

Also certified copy of file-wrapper and contents of letters patent No. 223,812, granted to Wm. F. Olin January 27, 1880, which is received in evidence and marked "Defendants' Exhibit Olin File-wrapper and Contents."

Also certified copy of file-wrapper and contents of letters patent No. 266,913, granted to Gammon and Deering as assignees of John F. Steward October 31, 1882, which is received in evidence and marked "Defendants' Exhibit Files and Contents of Steward 1882 Patent."

Also certified copy of file-wrapper and contents of letters patent of the United States No. 272,598, granted to John F. Steward February 20, 1883, which is received in evidence and marked "Defendants' Exhibit Files of Steward 1883 Patent."

Also copy of English patent No. 3585, granted Edwin Whitworth on the 24th day of September, 1877, which is received in evidence and marked "Defendants' Exhibit Whitworth English Patent."

415 Q. 2. What, if any, attention have you given to the mechanical arts; what experience have you had in examining and comparing machinery for the purpose of determining similarities or differences in construction and operation; and what, if any, opportunities have you had for becoming acquainted with harvesters and grain-binders?

A. I have been at work more or less in relation to the mechanical arts since I left college. I have been at work comparing and examining machinery for the last forty years, and have, for more than thirty years past, been frequently examined during each year, in suits in which patents were in question. I commenced an acquaintance with harvesters in the Patent Office in 1848. I have since then witnessed harvesters and binders while being con-
416–418 structed; have attended field trials of such machines, although I can only now specifically remember one such trial, and I have during the last thirty years been engaged as expert in many suits involving mowing machines, reapers, harvesters, self-rakers and binders.

Q. 3. Have you examined the Steward patent No. 191,264, and do you understand the same?

A. I have examined the said patent several times, carefully, and commencing first a month or more ago and believe I understand the same.

Q. 4. Have you examined defendants' machine and do you understand its construction and operation?

A. I have examined the so-called Winona machine at Mr. Banning's office, also a McCormick machine and a model McCormick machine.

Q. 5. Have you read the depositions of Gottlieb and George Heller and Reinhard Rubin, and examined model, Defendants' Exhibit "Heller Wind Board and Spring," and do you understand the construction and operation of said wind board and spring, as described in said depositions?

A. I have read the depositions referred to. I understand the construction and operation of said wind board and spring as described in the deposition, and have also examined the model mentioned in the question.

419 In the defendants' machines the grain is elevated in a continuous stream as in Steward's and as in many machines prior to Steward, and is dropped by the elevator on an inclined stationary deck, which is slotted for the passage of the packers and the needle. The packers have much the same motion as the toothed arms *p* of the Steward patent, but are moved rapidly many times during the formation of each gavel so as to force the grain along wisp by wisp against the binding cord, then against and under certain light spring rods, and finally against the compressor or resistance arm, the thing which Steward says he dispenses with. The construction substantially as in defendants' machine, including the spring wires which bear on the top of the gavel, is in the form that is used in defendants' machine, first shown, to my knowledge, in a patent to Appleby, granted Feb'y 18th, 1879, No. 212,480, and before

quoting I will premise that in the defendants' machine, as in the Appleby patent, the needle when it rises through the deck holds back the grain which is being continually delivered onto the upper end of the deck and thus performs one of the duties of the tilting table of Steward, although in a different way and by means of a different element of the machine, and further, what Appleby calls the chute board is what I have called and what is generally called the deck.

Appleby states as follows: "And the grain which accumu-
420 lates above the needle and is held between the chute board and the opposite side board as in a hopper, is prevented from tipping down at either end by two light spring fingers, 13, 13, attached to the supporting bar $13^1$, reaching across to and pressing lightly against the chute board."

This quotation from Appleby, as far as it goes, describes correctly the light springs in defendants' machine. The gavel is not compacted against them or compressed against them, but, on the contrary, part of the gavel often escapes beneath the springs, leaving some of the same gavel above them, and before any part of the gavel reaches the compressor arms. In order that I might ascertain how these springs, packers and deck really acted in defendants' machine, I went down to the McCormick Harvesting Machine Company's factory and had a machine run by power, binding straw. One of the men fed the straw onto the horizontal apron of the machine so it was carried along, then upward by the ascending elevator and delivered onto the deck to be bound. I sat and stood at the binding end of the machine and watched its operation while many bundles were bound. I can't say how many, perhaps 20 or 30, and I now produce a sketch or drawing which may, perhaps, enable me to convey a correct operation of the parts.

Defendants' counsel offers in evidence the drawing referred to by witness, and the same is marked "Defendants' Exhibit Sketch of Defendants' Packing and Compressing Apparatus."

In this drawing the teeth which correspond to the teeth of Stew-
ard's in so far as they come up through slots and act upon
421 grain are shown at *a*, *a*. The deck at *b b*; the needle at *c c*; the resistance or compressor arms at *d*. One of the light springs at *e*, $e^1$, $e^2$, $e^3$, in various positions. The knotting apparatus is shown at *f*, and the string or cord at *g*. The breast under which the gavel is packed is represented at *h h*, the dischargers at *k* and the drop-board at *l*. In the actual contrivance this deck has a slot in it, one for the passage of the needle and the packers which lie on either side of the needle.

The grain is delivered onto the chute or deck at *x* by the elevator, and the bound sheaf is delivered at *y y*, where the drop-board *l* is lowered, the sheaf being knocked out of the machine after it is bound by the discharges K, which revolve in the direction of the arrows with the shaft O. This sketch shows the needle nearest its lowest position, and the compressing arm *d* in its highest position, this being one of their positions during the operation of the machine. In this position the string *g* lies in the position shown by

full lines in the drawing when the packers first begin to operate, and before the gravel is compressed the string takes substantially the position shown at $g^1$, $g^2$, $g^3$. Just before the needle descended to the position shown in the drawing the curved tail of the needle was elevated above the deck, and, consequently, it held back the grain delivered by the elevator belt, and prevented the packers getting hold of the grain. When the needle descends below the deck the grain slides lower down, and is taken hold of by the packers. These in their rapid reciprocations, seize wisps of grain and carry them down the table against the cord $g$, and as they carry them against the cord, the light springs $e$ $e$ prevent the grain from slipping out endwise, and they do this because the gavel cannot
422 be balanced precisely on the cord, and parts of both ends of the different straws would tend to tilt diagonally and thus slide down the deck, thus causing the gavel to be out of shape, or some of the grain to scatter out of its ends. The cord is not, and cannot, be under heavy tension, and as the grain is shoved against it, it commences to bend, taking, after a time, the direction shown by dotted lines "$g^1$." About that time the springs commence to resist the action of the packers, the springs then rise gradually, as shown at $g^1$ $g^2$, and I noticed that in almost all cases, parts of the grain slipped from under the springs, while other parts of the grain to form the gavel remained above the springs. If any of this grain outside of the springs tilted, its ends were caught by the drop-board $l$, the grain was finally driven by the packers against the compressing arm $d$, and compacted against this arm, the springs then occupying the position $g^3$ and while the packers were driving it against the compressing arm, the ends of the sheaf were prevented from slobbering out by the drop-board $l$, this board performing the same duty when the sheaf is forced against the compressing arm that the springs $e$ did when a portion of the gavel was forced against the cord. The compressing arm $d$ is held in place by spring pressure, and the packers compact the gavel against this arm $d$ until they overcome the force of the spring which holds up this arm; this arm then yields slightly, still remaining nearly upright and by its yielding sets in motion the apparatus which actuates the needle and the knotting device and the discharge arms $k$. When the needle rises its first function is to hold back the grain that is descending along the upper part of the deck, keeping it out of the reach of the packers. As
423 & 424 it rises further, for it has to rise until it reaches about the point of the knotter, it encircles the gavel with the cord and still further compacts the gavel by squeezing it between itself and the resistance arm or compressor $d$. In some machines the resistance arm $d$ moves against the gavel while the needle is squeezing it so that the gavel is compressed between two moving parts. While the gavel is thus compressed between the needle and the resistance arm, the knot is tied and the string cut, then the resistance arm $d$ descends in the direction of the arrow, so does the drop-board $l$, and the discharge arm moving round knocks the bound sheaf out of the machine, the compressing arm $d$ and

the boards *l* then rise and the needle descends, carrying the cord into the position shown by full lines, and permitting the grain to slide down the deck and wisps of it to be caught by the packers. When this machine is ready for operation the lower ends of the two springs touch or nearly touch the decks and are gradually lifted by the grain as I have before stated, and the grain is compressed.

425 Q. 12. What opportunities have you had of seeing the grain-binders made and sold by the principal manufacturers during the last few years?

A. During the last few years I have seen almost all of them—Wood, Osborne, Deering, McCormick, Champion Machine, Morgan, and Minneapolis Co. These were all machines with binders.

Q. 13. Please state whether the complainant's machines, as you have seen them, follow the type of construction shown in the Steward patent No. 191,264, in respect to the combination of the fifth claim, or, if not, which, if any, of the types to which you have referred do they follow?

A. The complainant's machines do not follow the type of construction shown in Steward's patent. I think I have seen three of them, probably more, and they are all of the Appleby type as shown in the patent which I have referred to in a previous answer, with a stationary deck, light springs for preventing the grain from tilting, packers, a solid breast overlying the gavel, a needle to hold back the incoming grain while the gavel is being bound, and the compression or resistance arms all operated as in defendants' machine and in the Appleby patent.

426 Q. 16. Have you examined and do you understand the Olin patent No. 223,812?

A. I have frequently examined it during the last month or six weeks, and believe I understand the structure described and represented therein and the inventions referred to in the claims thereof.

Q. 17. Please state what you understand to be the invention described therein and referred to in the claims thereof.

A. This invention relates to a contrivance for removing the grain endwise or in the direction of its length while it is being elevated from the platform upon which it is deposited by the cutters by means of an ordinary elevator belt such as is shown, for instance, in the "Exhibit Fowler Model," and the object of the invention is to have the centers of the lengths of the grain in a certain position before they are delivered on the receiving table, or what I have heretofore called the deck, on which the gavel is bound, so that the centers of the grain, no matter what its length may be, shall be thrown onto this deck in substantially the same vertical plane that the binding needle works in. The patent states that the grain is to be elevated over the driving wheel (see Fowler model for illustration), by an elevator, and that it is desirable "that the grain shall be delivered

427 to the receiving table, (deck), so that it can be bound at or near the middle." He then states that the nature of his invention consists "in providing a belt or chain at the grain side," that is, the side furthest from the deck, and not over it, "of the machine for elevating the butts of grain," etc. Now, in order to move the grain

over endwise while being elevated, he employs, in combination with an ordinary elevator belt of any of the known kinds what he calls in the patent a "swinging elevator," and in other places an "adjustable elevator or belt Q," and this belt throughout the patent is called an elevator belt, that is to lift the butts of the grain, and it is to be on the grain side of the machine. The office of this belt is stated to be to "move the grain back on the elevator," and it is stated that this butt-elevator Q will strike against the ends of the butts of the grain, and that the butts are carried up by the elevator and that this butt-elevator Q "also acts as a means to cause the grain in its passage up the elevator (that is, the ordinary elevator of these machines), to be carried back so as to deliver it at one point regardless of its length." It is further stated in the patent that "as the grain is carried up by the elevator, (which is the ordinary elevator), the action of the face of the elevator or belt (the elevator Q), striking the ends of the butts will force the grain back as it ascends." There are other quotations in the patent, all stating that this butt-elevator Q is to act upon the grain while it is being elevated or lifted by the ordinary elevator.

This butt-elevator Q has its face perpendicular to the face of the ordinary elevator, or in the words of the patent the pulleys upon which it runs have "their faces parallel with the upper
428 surface of the main elevator;" that is, the ordinary elevating apron for carrying the grain over the driving wheel. This butt-elevator is of the usual construction, namely, an endless canvas, provided, if necessary, with ribs or teeth fastened to the canvas, and is kept in operation revolving with its acting face moving upward by means of suitable gearing ultimately connected with the driving wheel of the machine. This butt-elevator Q has the pulleys at its two ends mounted on a frame in such manner that the whole elevator can be swung on a pivot at its lower end and its lower end is pivoted, as I gather from the patent, just in front of the line at which the butts of the grain fall after being cut and thrown upon the platform by the reel. Therefore the upper end of this elevator can be moved towards the rear of the machine, that is, the part of the machine furthest from the horses, over the faces of the ordinary elevator. When the butt-elevator Q be thus inclined backward it is clear that its rearward canvas face always moving upward, as described in the patent, will strike against the butts of the grain which lie upon the ordinary elevator apron and move the whole grain endwise, while on the ordinary elevator belt and while the grain is being elevated, thus shoving the grain toward the rear of the machine and causing it to be brought onto the top of the deck further rearward than if this butt-elevator Q were not employed. In short the effect of the combination is to move the grain endwise and while it is lying on the elevator belt. By altering the angle at which the butt-elevator Q stands, that is, bringing its top toward the rear of the machine, the grain can be moved further rearward while being elevated, and the patent provides for the adjusting of the butt-elevator Q, so that when the machine is cutting long
429 grain it will move it backward but a little distance while be-

ing elevated, and when cutting short grain it will move it a greater distance backward while being elevated, so as to drop the grain upon the upper part of the deck with the center of its length as nearly as possible in the same plane that the needle works in, and the patent states distinctly that "such delivery is effected during the transit of the grain up the elevator." No special length is described for this butt-elevator Q, the patent stating that it "need not extend the entire length of the elevator (that is, the ordinary elevator) but may stop some distance beyond the upper elevator roll."

Means are described in the patent for driving the upper roller of the butt-elevator Q, and consequently the elevator Q when it is adjusted at different inclinations. This description is insufficient and does not describe mechanism which would operate the belt, but in the model, which I shall shortly introduce, which was made at the McCormick works, the model-maker has produced, by the exercise of some little ingenuity, a contrivance which will cause the butt-elevator to work at any angle at which it may be set. I may say before introducing the model that the canvas of the butt-elevator is set, as it were, on edge or at right angles to the ordinary elevator, so that its acting surface will act against the butts of the grain where they were cut off by the cutter, and that the patent further describes a board R, located in a place that cannot be exactly determined from either the drawing or the description, but certainly lying above the ordinary elevator toward the front of the machine and also some distance above the upper edge of the butt-elevator. The patent also describes rods S, $S^1$ or spring arms which perform the same duty and occupy the same position as the flat brass spring arms in the Fowler model. This board does not extend over the top of the ordinary elevator, but the spring arms $S^1$ do so extend, and are bent over its top in the way shown by the Fowler model. No office or duty to be performed by the board is described in the patent, either in connection with the butt-elevator or ordinary elevator. All that I can see it does is to hold the grain down upon the ordinary elevator like the flat brass springs of the Fowler model and the rod $S^1$ of the Olin patent, so that the teeth of the ordinary elevator may surely catch hold of the grain. This board R of Olin is mounted on a spring and is no more than the ordinary spring used many years before Olin, but the board unlike these ordinary springs does not extend over the top of the ordinary elevator and the binding deck of the machine. The first claim of this patent, as I understand it, refers to a combination of an ordinary elevator on the grain side of the machine, of a swinging elevator (that is, the butt-elevator Q), pivoted at its lower end, and suitable devices for shifting its upper end (that is, the rod, slide, etc., by which the upper edge of the elevator is adjusted), and the claim goes on to say whereby the swinging elevator (*i. e.*, the butt-elevator Q) forms a means for elevating the butts of the grain and delivering grain of different lengths at the same point substantially as specified, *i. e.*, moving the grain endwise on the ordinary elevator and while the grain is being carried up by the ordinary

430

elevator. The second claim is to substantially the same combination as the first, leaving out the means for shifting the upper end of the butt-elevator Q. The words in this claim, "having its pul-
431 leys or wheels arranged with their faces parallel with the upper surface of the main elevator," being no limitation as compared with the first claim, because the butt-elevator or belt Q cannot act in the manner described in combination with the main or ordinary elevator unless the pulleys of the butt-elevator are parallel with the upper surface of the main elevator.

The third claim is to the same combination as the second, *i. e.*, to the combination of the butt-elevator with the main or ordinary elevator, except that it is handled by the boards that the butt-elevator Q is to have "its lower end *e* advanced in front of the line of grain travel." I am unable to find in the patent any description which shows what these words mean; but suppose that they mean that the lower end of the butt-elevator Q shall be further forward in the machine as a whole than the line on which the butts lie when they are deposited upon the horizontal revolving apron H (in the drawing) which the patent calls "the carrier platform."

The fourth claim is to the precise mechanical devices for supporting the elevator and adjusting it at angles of greater or less inclination to the frame.

The fifth claim is to the means for driving the elevator when set at various angles, driving it from its upper end; and I may state here that the patent recites that the butt-elevator Q may be driven from its lower end, in which case the devices claimed in this fifth claim would be unnecessary; and further that the devices of this claim, or the ones that I have cited, are so described in the patent that I cannot understand how they will do the work required of them.

The sixth claim is to the combination of the butt-elevator
432 Q, the board R, and the main or ordinary elevator. The patent states that a chain operated by sprocket wheels might be used in place of the butt-elevator Q. I see no way in which this could be done, because if a chain was used the butts would entangle in the links and there would be no face like the canvas face of the belt to shove the butts of the grain rearward on the main elevator, as set forth in the patent in the following words, and also in other places: "As the grain is carried up the elevator (*i. e.*, the ordinary or main elevator), the action of the face of the elevator or belt (*i. e.*, the butt-elevator Q) striking the ends of the butts will force the grain back as it ascends."

(Counsel for defendant here offer in evidence the model referred to by the witness, which is received in evidence and marked "Defendants' Exhibit Olin Patent.")

I now produce this model of Olin patent previously referred to by me. In it the leather belt with brass fingers or pins upon them is the ordinary or main elevator of the Olin patent, on which I have marked the letter M, and the belt with its faces at right angles thereto, on which I have marked the letter Q, is the swinging ad-

justable elevator which shoves the butts of the grain endwise while they are being elevated on the main or ordinary elevator. This butt-elevator is pivoted at its lower end, as described in the patent, and has mechanism by means of which its upper end can be shifted, as described in the patent, so as to shove the grain endwise, to a greater or less extent, while it is being elevated. I have also marked an R on the board R of the patent and 6th claim, and the brass rods which lie over the main elevator belt and bent over the top roller thereof are the rods or spring arms $S^1$ of the Olin patent.

433–443 Q. 18. What, if any, novelty is exhibited in this Olin patent, in view of the prior art, as represented by patents and other exhibits in evidence? Please state also whether or not you find in defendants' machine any invention referred to in either of the claims of this Olin patent, giving your reasons for any opinions you may express?

A. Prior to the date of the Olin patent, namely, in the patent granted to Green, M'ch 6, 1877, No. 108,125, an adjustable device had been described for moving the grain endwise while it was ascending on the ordinary or main elevator belt. The patent to Green describes this apparatus as follows: "T designates a grain guide, which is pivoted at the lower front corner of the elevator frame, on the grain side thereof, and which is provided at its upper end with a handle convenient to the driver sitting in his seat. When cutting tall grain the grain guide T is not used; when cutting short grain, in order that it may be bound at or near the middle of its length, the driver moves the upper end of this grain guide T backward against the butts of the straw, so that the elevator will deliver the short grain into the receptacle *n* or in a position to be properly bound by the device I am now about to describe."

Following this description and the drawings of the patent I caused an illustrative model to be made, which I now produce, in which A represents the ordinary or main elevating belt, like the belts M of the Olin patent, because Olin says that any form of elevator other than that shown which will accomplish the same results can be used. Above this belt and lying with its face perpendicular to it is a board, on which I have marked the letter T, pivoted

444 at its lower end, and capable of swinging over the face of the main or ordinary elevator. This board T will, as the Olin patent states, "bear against the butts of the grain and crowd or move the grain back on the elevator toward the center, or in the words of the Olin patent, will force the grain back as it ascends toward the middle of the elevator, and when this board T is set at different angles it will force the grain further and further back as the butt-elevator of the Olin patent will do when it is set further and further back. Now this board will not lift the butts of the grain as the Olin butt-elevator Q does when it is provided with ribs or teeth, and if the court shall hold that these teeth are not included in the claim, then this board is the equivalent of the butt-elevator Q of the Olin patent, and whether an equivalent or not it is in the same combination with the main or ordinary elevator, and acts

upon the grain to shove it endwise while it ascends on the ordinary elevator in substantially the same way.

Counsel for defendant- offer in evidence the model last referred to by the witness, and the same is received and marked "Defendants' Exhibit Green Model."

The next patent bearing upon the invention of the Olin patent is the patent to Elward, No. 165,316, July 6, 1875. I have made an illustrative model, showing the parts of the Elward reaper described in this patent, which are in point in relating to the Olin patent.

The model referred to by witness is offered in evidence by counsel, and the same is received and marked "Defendants' Exhibit Elward Model Patent No. 165,316"

In this model the ordinary belt on which the grain falls is represented, and I have marked on it the letter B, and the ordinary elevator belt for elevating the grain over the driving wheel
445 is also represented, on which I have marked the letter M. In front of the horizontal belt there are mounted two rollers. These rollers carry a small belt, whose face is perpendicular to the face of the horizonal belt B. It is stated in the patent that one of these rollers may be driven by proper gearing, and it is so represented in the model (cones being substituted for miter gear).

That face of this small belt, which is then rearwards and nearest the horizontal belt, moves in the same direction as the horizontal belt, and it will be noticed that the small belt is set at an angle with the finger bar of the machine, (on which I have marked the letter F), and consequently also at an angle with the line of direction or travel of the grain. The Elward patent states on this point: "Upon the inner shoe, which, together with the elevator, is extended some distance in front of the bar to which the cutters are attached, I place two vertical pins or shafts upon which are placed rollers *g g*, carrying a short, endless apron G, set obliquely to the line of cut, with the rear end or roller nearest the elevator. This apron may be operated either by the friction of the passing butts of the grain, or it may be given a positive movement by gears, or belts and pulleys from any convenient driving shaft. the movement of the apron in either case serving to move or shove backwards the butts of the grain projecting over the finger bar."

There is a claim in the Elward patent to this contrivance. This butter-apron of Elward acts in precisely the same way with relation to grain moved by, and on the horizontal apron, that the butter-belt Q of Olin does upon grain carried upward by the main or ordinary elevator apron, shoving the grain endwise toward the
446 rear of the machine while it is being carried along. In both cases the butter-apron acts directly upon the butts at the point where they are severed, and in both cases the surfaces of the butting aprons are perpendicular to the upper surface of the aprons which advance the grain; while in both cases the pulleys which carry the butting aprons have their faces, in the words of the Olin

patent, parallel with the upper surface of the elevator or belt, which carries the grain that is moved endwise by the buttering apron.

Adjourned until 10 a. m., Wednesday, May 4th, 1887.

Met pursuant to adjournment, Wednesday, May 4th, 1887.
Present as before.
Witness continues his answer to question 18.

Now the claims of the Olin patent seem to have been made in view of this Elward patent No. 165,316, because the butt-elevator Q is throughout claimed (except in the 4th and 5th claims, which are to special devices for driving the elevator) in combination, not with the horizontal belt as in Elward's, but in combination with the main or ordinary elevating belt, which elevates the grain over the driving wheel; and this limitation is carried throughout the patent, as will abundantly appear from the quotations I have heretofore made, for in all cases the patent states the grain is carried up the main elevator, and that the butting elevator belt drives or crowds the grain endwise, while it, the grain, ascends. The novelty that amounts to anything in the Olin patent is the transferring of the Elward butter from the horizontal apron of a harvesting machine to the elevating apron of a harvesting machine.

447 Turning now to the defendants' machines they have, like Elward, and Olin, and Green, and many other harvesting machines long prior to either of them, ordinary elevating belts for elevating the grain over the driving wheel, such belts being first described in the Watson and Renwick patent of 1853. There is no butter-belt or apparatus of any kind for shoving the grain endwise while it is being elevated in the defendants' machine; on the contrary, and differing entirely from the Olin contrivance, the butts of grain, whether long or short, are in defendants' machine always delivered over the upper roller of the main elevator in the same line, and there is no combination whatever in defendants' machines of the butter Q with the main elevator of the harvester. When the grain, which, whether long or short, is carried over the upper roller of the elevator in defendants' machines, it falls upon a deck as shown in McCormick model, which deck in that precise form, so far as I know, was first shown in the Appleby patent I have before referred to; by reference to this McCormick model it will be seen that the grain slides down this deck for some distance before it is caught by the packers or packing teeth. On the upper corner of this deck there is mounted what may be called a butt slider and depressor. The faces of this depressor are set at right angles to the deck, not to the main elevator as in the Olin, and the faces of the pulleys which carry it are not parallel to the main elevator's face, as in Olin, but nearly at right angles thereto. Moreover, this depressor is not on the grain side of the machine, as Olin's is, but on the other side of the driving wheel. One of its operations is to knock the butts down, not to lift them up as in Olin's elevator, who distinctly states that that is one of the duties of his elevator;

448 "whereby it forms a means for elevating the butts of the grain," and it does not, in the words of Olin, so act "that

the grain shall be delivered to the receiving-table, so that it can be bound at or near its middle." On the contrary, in defendanst' machine the grain is moved endwise by the butt-depressor, only after it is deposited upon the receiving table and while it is sliding down the same. In defendants' machine, after the grain has been delivered to the sliding table, it is moved endwise by the butt depressor or depressing belt, the grain being crowded endwise over the surface of the tables as the grain slides down. This butter-belt, so far as its operation in moving the grain endwise is concerned, while it is sliding down, performs the duty of the adjustable board F¹, on the right-hand side of the deck of the machine described in the Elward patent of May 9, 1876, No. 177,231. I produce an illustrative model of this patent.

(The model referred to by witness is offered in evidence by defendants' counsel, and is marked "Defendants' Exhibit Elward Model Patent No. 177,231.")

In the Elward model I have marked the letter F¹ on the butter-board which I have referred to, and D on the deck of the machine. By comparison of this model with the McCormick model, it will be seen that this butter F¹ is mounted or pivoted at the same point and adjustable in substantially the same way as the butting belt is mounted and adjusted in defendants' machine. Now, going back again to the Elward model, 165,316, with the butting belt driving grain endwise on the horizontal apron, which butting belt he says, may be driven by machinery or not driven by machinery, it would appear that the defendants have substituted the moving or
449 driven butting belt of 165,316 for the butting board of Elward, 177,231, and have not availed themselves of any ideas taken from the Olin patent in suit. But leaving out all reference to prior machines and ignoring them all, it is my opinion that defendants' machines do not contain the inventions referred to in any of the claims of the Olin patent in suit.

First. They have no butter which elevates the butts of the grain. On the contrary, they have a depressor belt which causes the butts of the grain to descend.

Second. The defendants' butt-depressor is not pivoted at its lower end, but at its upper end.

Third. The butter of defendants' is not combined with a main or harvester elevator which is elevating grain, but, on the contrary, with an inclined deck or chute, on whose surface grain is sliding downward.

Fourth. In Olin the upper end of the butter is adjusted, and necessarily so, while in defendants' the lower end is adjusted, and necessarily so.

Fifth. In Olin the faces of the pulleys which carry his butter are parallel with the face of the ordinary or main elevator, while in defendants' the faces of the pulleys which actuate the depressor are at right angles to the main or ordinary elevator.

Taking up now the third claim on points where it differs from the first and second. The elevator of Olin is therein claimed as ar-

ranged as described in relation to the main elevator. Defendants' depressor is arranged in a totally different way in relation to the main elevator, and cannot by any possibility operate on grain lying on the main elevator. The fourth claim relates to means for supporting and adjusting the upper end of Olin's butt-elevator.

450 There are four elements in this claim, and it is evident that the defendants do not use this invention, first, because they do not move the upper end, but, on the contrary, the lower end of the depressor, and, second, because they only use a simple rod pivoted to the frame of the depressor instead of the four elements of the Olin claim. It being, as I understand, well known in patent law that a defendant must use all the elements enumerated in the claims or equivalent of each of them in order to infringe, and that a person who only uses one, two or three elements when four are claimed in combination, is not an infringer.

The fifth claim of the Olin patent relates to means for driving the butt-elevator in all the positions in which it may be used. The elements referred to in combination in this claim are those applied to the butt-elevator when it is driven from the end, swinging the end which moves in the arc of a circle, and are unnecessary when the butt-elevator Q is driven from the end on which it is pivoted, the patent stating that it may be driven from this pivoted end. The defendants drive their depressor from the pivoted end. They have not the sliding frame *i* of this claim. I have before said that I cannot understand the description of the apparatus referred to in this claim, but I know that the defendants do not need nor use this sliding frame, but, on the contrary, they use the well-known means for driving a belt which can be adjusted or swung on one of its pulleys, described and shown in the patent to W. L. Williams, May 11, 1869, consisting of a miter gear attached to the shaft of the pulley on which the belt is pivoted and another miter gear mounted on a driving shaft, without employing any sliding box, for which there is no necessity when the elevator is driven from its pivoted end.

451 The sixth claim of Olin refers to the same combination as the first, of the butting elevator Q, with the main elevator, with the addition to the combination of the board R. I have already said that defendants have no butt-elevator, nor even a butt-depressor in combination with the main elevator apron; neither do they use the board R. They do use a supplementary belt which holds the grain down upon the main elevator belt and overlies it through its whole extent, but this is an old device known long before Olin. The great use of this device is to confine the grain upon the teeth of the main elevator belt and prevent it being blown away by the wind. Such a belt may be seen in the patent to Watson and Renwick, of 1853. In my opinion the defendants do not use the combination set forth in the sixth claim.

I understand that complainant's expert has stated that the piece of tin which overlies the upper part of the deck of the McCormick model and the piece of sheet iron occupying this same position in the Winona machine are the equivalent of this short board R over-

lying the elevator apron. Now, the rods S[1] which are bent at their upper ends over the binding platform of the Olin machine do perform, in a measure, but not fully, the duties of the pieces of tin and sheet iron in the defendants' contrivance, but these rods are not referred to by themselves or in combination in any of the Olin claims, probably because Mr. Olin knew they were described in patents long prior to his patent.

Q. 19. So far as you know, has any grain-binder having a butt-elevator combined with the grain-elevator, substantially as exhibited in the Olin patent, been in practical use or on sale by the complainant, or anybody else?

452–467 A. To my knowledge no such binder has been in use or on sale.

Q. 20. Complainant's expert refers to the packers which compact the gavel in defendants' machine as a part of the grain-elevator; please state whether or not this is correct. Also, whether the term "elevator" had at and prior to the date of the Olin patent, a definite significance as applied to grain-binders, and, if so, to what element of the machine it refers?

A. The packers are not an elevating apparatus; but, on the contrary, a depressing apparatus for forcing the grain downward on the deck; moreover, the packers do not begin to act upon the grain to aid its descent until the grain has been nearly or entirely shoved over by the depressor crowding it endwise. The term "elevator" had a definite significance as applied to grain-binders long prior to the date of the Olin patent, and this term applied to the belt or belts, or their substitutes, which elevated the grain from the horizontal platform where it was deposited by the cutters and carried the grain over the top of the driving grain.

468 Q. 28. Have you now a model of the Gorham machine as exhibited in the patent, 159,506? If so, please state what, if any, bearing that machine has on this controversy, so far as the 5th claim of the Steward patent 191,264 is concerned.

A. I have here and I now produce a model of the Gorham patent No. 159,506, dated Feb. 9, 1875.

The model referred to by the witness is here offered in evidence by counsel for defendants, and the same is received and marked "Defendants' Exhibit Gorham Model," it being understood by counsel, with reference to both this and the McCormick model, that their being offered in this case shall not interfere with their being used by defendants in other cases, if required, but that they shall be open to the inspection of counsel and witnesses on both sides at all reasonable times, and shall be produced for use in court at the hearing.

The machine described in the Gorham was, so far as I know, the prototype of all modern binding apparatus. It was the first machine that packed the grain wisp by wisp by the reciprocating packer, against a spring compressor so as to compress the

469–471 grain in the center of the gavel when it needs to be com-

pressed, so that the band may be put around it as in the complainant's and defendants' machine.

It is also the first machine which set the wire-twisting or cord-tying apparatus in motion when the gavel had been sufficiently compacted to overcome the power of the spring. This spring, when compressed or extended to a certain point by means of the packers shoving the grain against the resistances, set in action a clutch that put this cord-tying or wire-twisting apparatus in operation, the result being that the driver was relieved from his duty of putting the tying apparatus in motion, when he judged by eye that sufficient grain was collected to make a sheaf and that the machine automatically performs this motion and that the bundles bound were substantially all of the same diameter. The bearing that it has on this controversy is that the defendants use this mode of packing the grain wisp by wisp against a spring resistance and also the mode of setting the cord-tying machinery in operation when the grain has been compressed to a certain extent. In the defendants' machines the packing is, as I have before stated, against a resistance and compression arm held up by a spring.

In the Gorham machine this packing was against a heavy leather belt firmly secured at one end and held in place by a spring at the other end.

472 Cross-examination by THOMAS A. BANNING, counsel for complainant:

X Q. 32. Did you ever operate in field or see operated in field, a harvester with a self-binder attachment?

A. I have never operated one and do not remember
473–552 any special instance where I have seen one operated in the field. I have watched them repeatedly in operation in a shop when supplied with straw by an attendant.

X Q. 33. Have you ever operated in the field, or seen operated in the field, a harvester which elevated the grain preparatory to its being bound?

A. In no instance, in the field, that I can remember.

X Q. 34. Have you ever operated in the field, or seen operated in the field, such a harvester in combination with a self-binder?

A. Not that I remember, in the field.

HENRY B. RENWICK.

Subscribed and sworn to before me this sixth day of May, 1887.

ALICE S. WELLS,
*Notary Public, Cook Co., Ill.*

Counsel for defendant further offers in evidence a copy of British letters patent No. 4092, dated September 22, 1881, to Howard & Bousfield, for machinery for cutting and binding corn crops, and the same is marked "Defendants' Exhibit Howard & Bousfield British Patent."

Also copy of letters patent of the United States, No. 274,772, dated

March 27, 1883, (application filed December 12, 1881), for a grain-binding machine, and the same is marked "Defendants' Exhibit Howard & Bousfield U. S. Patent."

553–595 *Stipulation.*

It is admitted on behalf of the complainant herein that if Stanley S. Stout, of Milwaukee, Wis., were called and sworn as a witness in this cause he would testify that he is a member of the firm of Stout & Underwood, attorneys for Gottlieb Heller and for the Milwaukee Harvester Company, assignee of said Heller, in the matter of the application for a patent referred to in the cross-examination of said Heller, and remarks of counsel, on pages 171 to 174, inclusive, of the printed record of defendants' testimony herein; and that the application for a patent referred to by the said Heller in his said cross-examination (X Q. 131 to 138, inclusive) relates to a harvesting machine of the class known as a "header," and does not contain or in any way relate to either the "butter-extension" or the "wind board," concerning which the said Heller testified in his direct examination,

BANNING & BANNING.
*Solicitors for Complainant.*

Chicago, May 13, 1887.

596–607 I hereby certify that the foregoing depositions were reduced to writing in the presence of the witnesses, and by counsel herein noted as present, in part by myself and in part by S. W. Hicks, my clerk; that the witnesses were duly sworn before testifying, and the depositions signed by the witnesses in my presence. That I am not counsel for nor related to any of the parties hereto, and that by consent of counsel these depositions are to be delivered to counsel for defendant, to be filed by him before the hearing with the same effect as if transmitted by me to the clerk of the court in the usual manner.

GOVNOR TEATS,
*Notary Public Within and for the County of Dickinson; State of Kansas.*

Term expires 8–4–1888.

May 27th, 1887.

608 JOHN B. KIRCH, Esq., who witnesses in behalf of said defendants, being duly sworn, deposes and says in answers, as follows:

Examination by Mr. DYRENFORTH:

Q. 1. What is your name, age, residence and occupation?
A. My name is John B. Kirch; 46 years. I reside in Winona, Minnesota; selling farm machinery.
Q. 2. In what business were you in the year 1881?
A. Selling farm machinery.

609 Q. 3. What was your business in the year 1880?

A. Also selling farm machinery.

Q. 4. Did you have any agency for the sale of farm machinery in the year 1880? If you did, please state what that agency was.

A. I was agent for several firms of farm machinery.

Q. 5. Did you have any agency for the sale of grain-binders in the year 1880? If so, please state what agency it was.

A. I was agent for the Deering machine.

Q. 6. Which Deering do you refer to?

A. Wm. Deering, of Chicago.

Q. 7. When did you first become agent for Wm. Deering for the sale of harvest machines?

A. I think it was in 1879, if I remember, I commenced selling harvesters, while J. D. Easter handled the territory. Then afterwards for Gammon & Deering, and then Wm. Deering, and handled it right along.

Q. 8. Were you the agent for Wm. Deering for the sale of the Appleby binder manufactured by him in the year 1880?

A. Yes, sir.

Q. 9. Was 1880 the first year that you sold Appleby binders as the agent of Wm. Deering?

A. Yes.

Q. 10. In the year 1880 did you test the machine in the field and observe its operation?

A. I did personally observe it; yes, sir.

Q. 11. State whether in the operation of the Appleby machine manufactured by Wm. Deering in the year 1880 you observed any defects, and whether you experimented with a view to overcoming the imperfections that you found. And if you did, please
610 state what those experiments were, when they were made and in what they resulted, if anything.

A. Of course, I discovered the defect in the shape of the butt of the bundle, but I did not experiment with anything in the year 1880. I experimented in the spring of 1881. I experimented with the machine on the floor of the store, elevating and binding straw by hand, and by doing so the shape of the bundles was very much the same as out in the field; so one day, or evening rather, Mr. Scherffius, who used to be at our store evenings, and frequently used to amuse ourselves by turning the machine; while Mr. Scherffius was binding, or rather turning the crank, (we had a crank fixed so as to operate the whole thing,) I took a board and held it below the adjuster canvas to prevent the grain from shooting out below the butt-adjuster, and after the bundle was bound was very much pleased with the result.

Q. 12. Is Mr. Scherffius, to whom you refer, still alive?

A. He is not.

Q. 13. How long since did he die?

A. He died in the fall of 1885. It will be two years this fall.

Q. 14. When was it that you made this first experiment by holding the board against the butts of the grain below the butt-adjuster while Mr. Scherffius operated the binder?

A. I could not give the date. It was in the spring of the year 1881. Perhaps latter part of March or April. It was after we got the sample machine.

611 Q. 15. State whether you carried the experiment any further at that time than you have already described, and if you did not, please give the reasons for not doing so.

A. Well, I did not go any further. I thought of attaching it with straps to the pins on the lower adjuster canvas rollers, but the pins were too short. They barely came even with the frame, so I could not attach it with the same pin.

Q. 16. When you speak of straps do you mean iron straps?

A. Yes, sir; I mean straps to fasten it to the board; iron straps to connect it to the pin.

Q. 17. The butt-adjuster consists of a frame pivotally connected at its upper end to the binder above the deck, and having a roller at its upper end and another at its lower end, and a canvas apron passing longitudinally around the adjuster over the rollers, does it not?

A. Yes, sir.

Q. 18. And the lower roller is fastened to the lower end of the frame by iron trunnions, which project nearly or quite through the frame of the adjuster, above and below, is it not?

A. Yes, sir.

Q. 19. Is it to those trunnions to which you refer when you say that the pin was not long enough to permit the extension to be connected to it by a strap?

A. Yes, sir; that was my way of expressing myself.

Q. 20. Was it your intention at that time to connect the board extension to the lower end of the butt-adjuster, rigidly or pivotally?

Objected to as incompetent, inquiry being as to what the witness did, and not as to what he intended.

A. The pin and the hole in the strap would make it flexible, or allow it to swing.

612 Q. 21. Was it your intention to have it swing freely or to attach something to it to control the movement?

Same objection.

A. It was my intention to have it swing separate, so as to have it swing independent of the adjuster.

Q. 22. Did you intend to attach anything to it so that it could be moved back and forth; if so, explain what?

Same objection.

A. I intended to attach a rod to it and take it on top of the grain shield and operate it by hand.

Q. 23. That is to say, as I understand you, you intended to have it operated by hand from the driver's seat the same as the butt-adjuster is operated by a separate rod?

Same objection.

A. Yes, sir.

Q. 24. Did you have any other plans at that time for evening the butts of the grain; if so, please state what they were.

A. I wanted to experiment with it. Then I intended to have the adjuster frame made with three rollers in it. I said about the same length they were originally, and then from there have a pivoted lower roller, and the extension to be made below that about ten or twelve inches long, and also a roller in that, and then run the canvas clean round the three rollers.

Q. 25. In that way the canvas apron would go around both the butt-adjuster proper and the extension?

A. Yes, sir; and I intended to extend it down so as to come down to the drop-leaves, to prevent the grain from shooting out below the adjuster.

613 Q. 26. Did you also contemplate making the butt-adjuster rigid instead of swinging?

Same objection as before.

A. I contemplated making one rigid and one swinging, this style with the extension, as I said, the three rollers and the canvas to run round it.

Q. 27. Now please state whether you proceeded at any time to have your ideas concerning an extension to the butt-adjuster put into practice; and if so, when it was and what you did?

A. I did. I went to Mr. Deering's factory in the latter part of June, 1881, being personally well acquainted with Carver, the assistant superintendent I think he was at that time. I told him what I had done, and I told him about those devices, and I asked him if he would make them for me and send them to me. He told me I would have to see Mr. Deering, and if he gave him orders, he would be only too glad to make them for me and send them to me.

Q. 28. Did you see Mr. Deering and did he direct Mr. Carver to have some of them made and sent to you, according to your direction?

A. Yes, sir; he did in my presence; Mr. Deering gave him orders in my presence.

Q. 29. How many such devices were to be made for you, and what was their nature?

A. Well, there were to be three made; one with the board, as I have already stated, the other two with the canvas extending down to the drop-leaves. One to be rigid and the other to be flexible or pivoted so as to swing.

Q. 30. Were those ever sent to you?

A. I never received them.

614 Q. 31. Do you know of your own knowledge whether anything was done in regard to them?

A. I do not.

Q. 32. The pivoted board extension, as I understand you described it to Mr. Carver, was the same as you have described it in the earlier part of your deposition, was it?

A. Yes, sir.

Cross-examination by Mr. BANNING:

X Q. 33. What kind of a description did you give Mr. Carver or Mr. Deering, written or oral, and did you furnish them with any sketches or drawings?

A. I gave Mr. Carver a description of it in the factory where the machine was set up. All the sketches there were was what I made with a pencil, showing him how I wanted it. I am not a draftsman myself.

X Q. 34. Do you know whether you ever actually made any sketches of it or not?

A. I never made any sketches only what I would naturally make on a piece of board that was handy to show him my ideas.

X Q. 35. As I understand your statements, you never, in fact, made or had made a single one of these butt-adjuster extensions which you speak of having in mind?

A. No, I did not make any. I relied on Carver to make them for me.

X Q. 36. How long did you rely on Carver to make that; from June, 1881, up to the present time?

A. No; I discovered they had a butt-adjuster on the machine. The first or second year afterwards they had an extension on the machine.

615 X Q. 37. Did you consider it the same as the one you had explained to them?

A. Yes.

X Q. 38. Did you say anything to them about it and object to their using it?

A. I spoke to several of their agents about it. I think I spoke to Mr. Hill and said I had told Carver about this and told the whole transaction I had with Carver.

X Q. 39. Did you tell anybody else?

A. I made no secret of it.

X Q. 40. What was your object in going to Mr. Deering to have him make it?

A. Why, simply because I was Mr. Deering's agent, and they were making the machines I proposed to put them on, and had better facilities for making them, and I was well acquainted with Mr. Carver.

X Q. 41. Did you say anything to Mr. Deering or Mr. Carver about getting it patented?

A. I did not, as I remember.

X Q. 42. How soon did you know of Steward's patent No. 272,598?

A. I never knew of it until I heard it spoken of by the Winona Harvester Works people, they being then sued under it.

X Q. 43. You regard this butt-adjuster extension as an important and valuable feature of the twine binder now generally used, do you not?

A. I do.

X Q. 44. Without some device of this kind to keep the butts of

the grain even, the present twine binder would be very imperfect and practically inoperative, would it not generally?

616 A. No, I would not say that. There are a great many without them.

X Q. 45. You have been engaged in selling these twine binders ever since they first came into use, have you not?

A. Not ever since they first came into use. Since 1880.

X Q. 46. Would you now be willing to attempt to sell them as agent, without this butt-adjuster extension or some equivalent means of evening the butts of the grain?

Objected to as incompetent and not cross-examination.

A. Why, certainly; it depends on the price. The price rules those things.

X Q. 47. How long since you have sold any without the butt-adjuster extension for evening the butts of the grain?

A. I have not sold any since 1882 or 1883.

X Q. 48. So far as you know, who was the first to manufacture and put on the market the present Appleby twine binders?

Objected to as incompetent and not cross-examination.

A. As far as I know, the Beloit people were the first. There might have been others. Appleby, I think, was with Parker & Stone, of Beloit, in 1878.

X Q. 49. Do you not know that Wm. Deering was the first to make this Appleby binder a success and to put it on the market in large numbers; what is your understanding as to this?

Same objection.

617 A. My understanding as to that, as far as success is concerned—I do not know what success Parker & Stone or Appleby met with—my understanding or what I heard at the time was that Deering put out fifty machines in 1879. That was what I was told in '79, and in '80 I do not know how many. I sold twenty-four. The first one I saw was in '79. Carver was here with it, Appleby also, but he did not stay. Just came out into the field where we were.

Redirect examination by Mr. DYRENFORTH:

R. D. Q. 50. If I understand you correctly, in your direct examination, the pivoted board butt-adjuster extension, as you intended to have it made, was not to operate automatically by the movement of the butt-adjuster, but was to be operated by means of a rod by the driver; is that correct?

Objected to as incompetent and leading.

A. Yes, that is right, though I had not time to experiment. I wanted those things to experiment with them in the field.

R. D. Q. 51. When you explained it to Mr. Carver and Mr. Deering, did the idea appear to be new to them?

A. I explained it to Mr. Carver, not to Mr. Deering.

R. D. Q. 52. Did the idea seem to be new to Mr. Carver when you explained it to him?

Same objection.

A. Yes; he said he would make them for me, and that was about the sum and substance. We went upstairs to the machine they had set up, and there I explained it to him how I wanted it.

R. D. Q. 53. Have you any interest, directly or indirectly in the result of this suit?

A. I have not.

618 R. D. Q. 54. You have stated that you went to Chicago and had your conversations with Mr. Carver and Mr. Deering in regard to the butt-adjuster extension in the latter part of June, 1881. How do you fix that date?

A. Well, in the first place, I went down to see if I could not get Mr. Deering to let me have more machines—harvesters and binders. I had at that time, if my memory serves me right, three car-loads, and had them all delivered, and had thirty or more orders with me to show Mr. Deering that the machines I wanted were actually sold. And that was the only time we were hard pressed for machines except in 1880. It was the second year of my selling the Appleby binder. The first year I introduced them they gave general satisfaction, and the next year the demand was far greater than I expected.

R. D. Q. 55. You are certain that it could not have been in 1880 that you made this visit to Chicago, are you?

A. Yes, sir.

R. D. Q. 56. And it could not have been as late as 1882?

A. No, sir.

R. D. Q. 57. Was it before or after the 4th of July that you had your conversation with Mr. Deering and Mr. Carver?

A. It was before the 4th of July. I got to Chicago Friday morning and rushed round and got through, and got to Racine Friday evening, intending to leave Racine so as to get home Sunday morning, but I got detained in Racine and was obliged to stay over in Racine over Sunday. I came home Monday evening about nine

619 o'clock. I was desirous of getting home Sunday to be home for the 4th of July.

JOHN B. KIRCH.

Subscribed and sworn to before me this 17th day of June, A. D. 1887.

HENRY M. LAMBERTON,
*Notary Public, Winona Co., Minn.*

By Mr. BANNING: Counsel for the complainant objects to the foregoing questions and every part thereof as immaterial and incompetent, on the ground that there was no sufficient ground in the allegation and answer to support evidence of this character; that is, to the effect that the invention was made by the witness and directly or indirectly communicated by him to John F. Steward, the patentee named in patent No. 272,598.

620 $8.25.

(2–175.)

DEPARTMENT OF THE INTERIOR,

[Vignette.]

12581.

UNITED STATES PATENT OFFICE.

To all persons to whom these presents shall come, Greeting:

This is to certify that the annexed is a true copy from the files of this office of the file-wrapper and contents in the matter of the letters patent granted William F. Olin January 27th, 1880, number 223,812, for improvement in harvesters.

In testimony whereof I, M. V. Montgomery, Commissioner of Patents, have caused the seal of the Patent Office to be affixed this 26th day of June, in the year of our Lord one thousand eight hundred and eighty-six, and of the Independence of the United States the one hundred and tenth.

Seal Patent Office, United States of America.

M. V. MONTGOMERY,
*Commissioner.*

621 Model; 1 dr., 2 sh'ts.

*Petition.*

To the Commissioner of Patents:

Your petitioner, a resident of Chicago, Cook Co., Illinois, prays that letters patent may be granted to him for the invention set forth in the annexed specification, vesting in him and his legal representatives the exclusive right of the same upon the terms and conditions expressed in the act of Congress in that case made and provided, and further prays that you will recognize West and Bond, of Chicago, Ills., as his attorney-, with full power of substitution and revocation, to prosecute this application, to make alterations and amendments therein, to receive the patent, and to transact all business in the Patent Office connected therewith.

WILLIAM F. OLIN.

622 *Specification.*

To all whom it may concern:

Be it known that I, William F. Olin, of the city of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful improvements in harvesting machines; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, and *on* the letters of reference marked thereon, which form a part of this specification.

623 Figure 1 is a front elevation.

Figure 2, a top or plan view.

Figure 3, a detail of the cover of the elevator.

Figure 4, a detail, in section, of the devices for elevating the butts of the grain.

Figure 5, a detail of the same parts.

Figure 6, a detail, showing the devices for shifting the butt-elevator.

In that class of harvesting machines where the grain is received upon a carrier platform and elevated over the drive-wheel by an elevator and deliverer to the binders or an automatic binder it is desirable that there shall be no stoppage in the flow of the grain in its passage to its place of delivery; that the butts of the grain shall be carried up parallel, or nearly so, with the heads of the
624 grain so as to deliver the grain in proper shape for binding purposes, and that the grain shall be delivered to the receiving table so that it can be bound at or near the middle.

The object of this invention is to provide devices for attaining all of these results, and it consists in interposing a roller between the lower end of the elevator and the inner end of the grain-carrier to facilitate elevating the grain and prevent clogging at that point and prevent the grain from being carried down or falling through between the elevator and carrier; in providing a belt or chain at the grain side of the machine for elevating the butts of the grain
625 supported on a swinging bar so that it can be adjusted according to the length of grain being elevated to deliver the grain so that it can be bound at the middle; in devices for operating and adjusting the elevator for the butts; in the peculiar construction of the cover; in arranging and operating the belt for the butts so that it prevents any clogging by short grain at the heel of the sickle; in arranging the device for elevating the butts so that it will bear against the butts of the grain and crowd or move the grain back on the elevator toward the center for the purpose of straightening the grain in its passage up the elevator and delivering it so that it can be clasped or bound near the middle to facilitate the ease of binding, and in the several parts and combination of parts hereinafter described as new.

626 In the drawings—

A represents the main frame.

B C, the elevator frame.

D, the cross-pieces supporting the binder table or platform or binder.

E, the cross-piece secured to the cross-pieces D and supporting the driver's seat.

F, the cross-pieces between which the main or driving wheel (not shown) is located and on which it is journaled in any suitable manner.

G, the rollers for the carrier platform.

G′ the axles or shaft of said rollers.

H, the carrier platform.

I, the interposed roller.

I′, the shaft of the roller I.
J, the lower elevator roller.
J′, the shaft of the roller J.
K L, the upper elevator rollers.
M, the elevating belts.
M′, the backing board.
M″, the angular opening on the front edge of the backing board.

627 N, the strips of metal or fingers at the upper end of the elevator.

O, the curved piece of metal supporting the fingers N.
P, the platform on which the grain is delivered.
Q, the belt for elevating the butts.
R, the board portion of the cover.
S, the cross-piece secured to the board R.
S′, the spring arms, forming the other portion of the cover.
T, the springs connecting the piece S with the driver's platform.
U V, the driving pulleys.
W, the shaft of the roller K.
*a*, the teeth on the elevating belts.
*b*, the teeth on the butt-elevator belt.
*c d*, the pulleys carrying the butt-elevator belt.
*c′ d′*, the pulley shafts.

628 *e*, the pivoted connecting bar or strap on which the butt-elevator pulleys are mounted.
*f f′*, the caps for the pulleys *c d*.
*g h*, the miter wheels giving motion to the butt-elevator.
*i*, the sliding head or journal support for the miter wheel *g*.
*j*, the frame or guide in which the support *i* slides.
*k*, the pin for holding the head *i* in place laterally.
*l*, the sliding plate or bar.
*m*, the pivot for the sliding plate *l* and bar *n*.
*n*, the bar connecting the sliding plate with the operating lever.
*o*, the lever.
*p*, the pivot for the lever *o*.
*q*, the bracket supporting the lever.
*r*, the pivot at lower end of lever for connecting it to the rod or bar *n*.
*s t*, the supports for the sliding bar *l*.
*u*, the adjustable bearing for the lower of the upper rollers of the elevator.

629 *v*, the curved plate at the foot of elevator over the front bearing of the roller I.
*w*, journal bearings of the roller I.
*x*, the plate or catch for holding the bar *e* in place and preventing it from rising.

The parts A, B, C, D, E, F, G, G′, and H may be of any of the ordinary forms of construction, and the completed machine is to be provided with a drive-wheel, sickle, divider, grain wheel, and suitable gearing for operating the several parts, but as these parts may

be of any of the usual forms of construction they are neither shown nor described.

The lower elevator roller, J, is suitably journalled, near the lower end of the elevator, in the pieces B of the elevator frame. Be-
630 tween this roller, J, and the inner roller of the carrier platform is another roller, I, so located and arranged as to permit and aid the passage of the grain from the carrier platform to the proper position to be taken by the elevating belts or devices and prevent the grain from falling through at that point. This roller, as shown, is journaled in suitable bearings, *w*, secured to the main frame A, and its shaft I′ projects some distance beyond the rear of the frame, and is provided with a pulley, U, by means of which the roller is driven. The roller J is so arranged in relation to this interposed roller, I, that the teeth *a* of the elevating belts M will just clear the roller I.

The shaft J′ of the roller J extends beyond the elevator
631 frame and is provided with a pulley, V, for driving the roller J.

The elevating belts M pass over the roller J at the bottom and over the rollers K L at the top of the elevator frame. These belts, M, are provided with teeth or pins *a* for engaging with and elevating the grain, and by passing the belts over two rollers, K L, at the top, as shown, instead of one, a positive downward movement is given to grain, which greatly facilitates its delivery upon the receiving table or grain receptacle.

The receiving table P, as shown, is located on the cross-bars D, and to it is secured a curved piece of metal, O, so arranged as to prevent the grain on the table from falling back into the machine beneath the elevator. To this curved piece of metal, O, are se-
632 cured springs or fingers N, so arranged and formed as to extend up and over the lower one of the upper elevator rollers L, the object of which fingers is to prevent the grain from going between the two upper rollers and also to insure its delivery to the binder.

The butt-elevator belt is provided with suitable teeth, *b*, and is located on top of the forward piece B of the elevator frame, and is supported and driven by two pulleys, *c d*, which have their faces or sides parallel with the top of the piece B. These pulleys, *c d*, are connected together by the piece *e*. This piece, *e*, may be located in a groove, *e′*, formed in the piece B, which groove is of such form as to permit the piece *e* to move backward and forward or may be located directly on top of the piece B. The shaft *c′* of the
633 wheel *c* has its lower bearing in the piece B, and its upper one in the cap or bent-up bar *f*, which bar or cap is permanently secured, as shown, to the bar or strap *e*. This shaft, *c′*, also forms a pivot for the bar or strap *e* to swing on. The upper bearing for the shaft *d′* of the pulley *d* is in the bent-up portion or cap *f* of the strap *e*, and to the lower end of this shaft, *d′*, is secured a miter-wheel, *g*, which gears with a similar miter-wheel, *h*, secured to the shaft W of the roller K. On the shaft W and sliding thereon is a piece of metal, *i*, so formed as to have two arms parallel to each

other and a connecting piece. The arms of this piece, *i*, are located on the shaft W, and between them is the wheel *h*, so that this
634 piece, *i*, is above and on each side of the wheel *h* and forms a guard therefor to prevent any grain from becoming entangled therein. In the outer arm of this sliding head, *i*, is the journal bearing for the lower end of the shaft *d'* of the pulley or wheel *d* for the upper end of chain Q, so that as the head *i* is moved back and forth on the shaft the upper end of this chain, Q, must be carried with it by reason of the journal bearing for the shaft *d'* being in the sliding head. By locating the wheel *h* between the arms of the sliding head and journaling the wheel *g* thereto, as shown and described, it will be seen that the wheels *g h* must be in gear, no matter what the position of the upper end of Q may be.

The inner arm of the sliding head *i* extends some distance
635 below the shaft W and enters a suitable guideway in the support or frame *j*. As shown, this arm passes between a pin, *k*, secured to *j* near its middle, and ears or projections formed on the edge of *j*, at the top and bottom, so that this arm can slide up and down to some extent, but has no lateral play.

The guide or support *j* is permanently secured to the bar *l*, which bar moves forward and back in the bearings or guides *s t*, one of which, *s*, is secured to the piece B, and the other, *t*, to the backing M', of the elevator. To the inner end of this bar *l* is pivoted at *m* a bar or rod, *n*, which extends across the elevator and projects some distance beyond the elevator frame, and to its outer end is pivoted at *r* the lever *o*, which lever is supported on a bracket, *q*, at-
636 tached to the piece B, and is held in place thereon by the pivot *p*.

The roller L is journaled in adjustable bearings, *u*, secured to the pieces C of the elevator frame, by means of which the belts M can be kept at proper tension.

As shown, the forward bearing of the roller I is covered with a curved piece, *v*, but in practice this piece may be dispensed with and the bearing so formed as to accomplish the same purpose of permitting the grain at that point to pass up, so as to be reached by the teeth *b* of the belt Q.

The rollers G I J K L are to be driven by means of suitable belts and pulleys operated from the main or drive wheel.

637 It will be seen that as the lever *o* is moved to or from the driver it will carry the upper end of the elevator Q out or in, as desired, by reason of the connecting rod *n*, sliding bar *l*, supporting frame or piece *j*, sliding head *i*, gear wheels *g h*, and shaft *d'*; and as the upper end of the belt or elevator is carried in or out it will describe an arc of a circle, so that the pulley *d* will be carried up and down slightly, carrying with it the gear wheel *g*.

The sliding head *i* must therefore be so arranged and connected to the shaft W and the devices for sliding it that it will be self-adjustable in order to allow the upper end of the elevator or belt Q to operate.

638 The cover for preventing the grain from being blown away as it is elevated consists of the board R and spring arms S'.

The board R is located over the belt or elevator Q and is so arranged as to keep the butts of the grain down, so that the belt can elevate them and at the same time permit their easy passage up the backing board M′. To the lower end of this board R is secured a cross-piece, S, which is connected and supported from the driver's platform by means of spring arms T. This arrangement permits the cover or arms S′ to yield according to the amount of grain being elevated.

The backing board M′ is secured to and between the posts
639 or pieces B in any suitable manner, and is so arranged as to permit the easy passage of the grain, the grain in its passage being between this backing board M′ and the cover R S′. The front edge of this backing board M′ is provided with an angular recess, M″, formed by cutting out a portion of its upper face, as shown in Figs. 2 and 5, so that the backing board will not interfere with the swinging of the belt or elevator Q on its pivot. The backing board M′ might be so arranged as to dispense with the recess M″, but by using this recess M″ it permits the lower edge of the butt-elevator to come below the upper line of the backing board, so as to insure its engagement with all the butts of the grain
640 and prevent the grain from getting between the backing board and butt-elevator.

The elevator or belt Q can be used with other forms of elevators than the one shown to accomplish the same results, the belt being so arranged in relation to such elevator as to run with its edge parallel with the upper face of the backing board or elevator.

As shown, the frame or support for the elevator or belt Q is pivoted at the lower end of the elevator frame, and has its driving mechanism located at the upper end, but the driving mechanism may be located at the lower end of the belt Q or elevator if desired.

641 As shown, the butt-elevator Q consists of a belt, Q, provided with suitable teeth *b*, operated by pulley wheels, but a chain provided with teeth or not, operated by suitable sprocket wheels at the upper and lower ends, might be used in place of the belt.

By arranging the pulleys *c d* so that their flat faces will be parallel with the top surface of the elevator frame, the butt-elevator will be operated so that its face will strike against the end of the butts of the grain when elevating the butts, and by supporting the butt-elevator on a frame or support pivoted at its lower end and free to swing back and forth at its upper end the elevator can be so adjusted as to cause the grain to be delivered at one point,
642 no matter what the length may be, for as the butts are carried up by the elevator the grain will be forced back towards the middle of the elevator by reason of the belt or chain striking against the ends of the butts and forcing them back, so that, by this arrangement of the butt-elevator, it not only serves the purpose of elevating the grain, but also acts as means to cause the grain in its passage up the elevator to be carried back so as to deliver it at one

point regardless of its length, the upper end of the butt-elevator being carried in or out as the grain is short or long.

For delivering long grain in proper position for binding purposes the belt or elevator Q is to be so arranged that its upper end
643 will be over or nearly over the piece B, in which position the elevator will operate in a line with or nearly with the front of the backing M′, and the grain will be carried up thereby so as to deliver it at a point where it can be clasped and bound at or near the middle.

For delivering medium grain the upper end of the elevator Q is to be carried or swung over the backing or elevator the required distance, and then as the grain is carried up the elevator the action of the face of the elevator or belt striking the ends of the butts will force the grain back as it ascends toward the middle of the backing or elevator, and this carrying or forcing endwise of the grain
644 will continue until it has reached the top of the elevator Q, when it is in proper position to be delivered at the same point as the long grain, so that it can be clasped or bound near or at the middle.

For delivering short grain the upper end of the elevator Q is carried still farther over the backing or elevator for the grain, which makes the angle at which it stands greater and forces the grain as it ascends still farther back on the backing or elevator by the action of belt or elevator Q on the ends of the butts, so that short grain will be carried up the elevator and delivered at the same point as before, so that it can be clasped or bound at or near the middle.

The upper end of the elevator Q is shifted to bring it to
645 the desired position to deliver long, medium, or short grain by the operator, who takes hold of the lever *o* and moves it toward or from the elevator frame. As the upper end of the lever is moved away from the frame, its lower end will be carried in and, carrying with it the rod *n*, will slide the plate or bar *l* forward, carrying with it the support or frame *j*, with which the sliding head *i* is connected, which head will be moved forward on the shaft W, carrying with it the gears *g h*, and through the shaft *d′* the upper end of the elevator Q, bringing the parts into the position shown in Fig. 2. When the upper end of the lever *o* is carried toward the driver its lower end is carried out, carrying with it the rod
646 *n* and sliding bar or plate *l* and frame or support *j*, which moves the sliding head *i* back on the shaft W, and with it the gear *g h*, and, through the shaft *d′*, carries the upper end of the elevator Q over the backing or elevator to any desired position to deliver the grain at a point where it can be clasped or bound at or near the middle.

By this arrangement the grain as it is being elevated will be carried back or endwise, so that the middle of the grain will always come to the same point, no matter what the length of the grain may be, and so that it will be delivered in such a position that a binder who stands at a given place or point
647 can clasp the sheaf in the middle and bind it without the necessity of shifting his position to accommodate himself

to the delivery of the grain, and by thus delivering all lengths of grain at a uniform point the ease with which it is bound is greatly facilitated, and in case an automatic or self-binder is used it can be arranged stationary at the point to bind the grain properly and the grain will be carried up and delivered at that point so as to enable it to be bound by the self-binder at or near the middle, so that all devices which are now used for the purpose of adjusting a self-binder to the position to enable it to bind the grain properly are dispensed with, as the grain, whether long or short, will be delivered at the same point by shifting the
648 upper end of the butt-elevator as before described.

By this arrangement all the devices for affecting a fore-and-aft adjustment for binding purposes are dispensed with and the same means employed for elevating the butts also afford the means for properly delivering the grain, and such delivery is affected during the transit of the grain up the elevator.

The elevator Q need not extend the entire length of the elevator, but may stop some distance below the upper elevator roller, as the grain, after it is once forced to the proper point on the elevator, will be carried up and delivered in that condition.

649 In operation the grain, as it falls upon the carrier platform H, is carried forward to the roller I, which, also being in motion, carries the grain up over it, when it is received by the teeth *a* of the elevator belt and by the belts M carried up and delivered to the receiving platform or table.

As machines have been heretofore constructed the grain as it passes to the foot of the elevator was liable to stop and accumulate at that point, which prevented the easy elevation of the grain. By interposing the roller I between the foot of the elevator and the end of the carrier, as shown, it will be seen that no grain can accumulate at that point, as the roller I will move it forward and over the roller under all circumstances, thus keeping the grain con-
650 stantly in motion at the foot of the elevator, so that it cannot become tangled or accumulate and clog the elevator, and this roller I by reason of its revolving will also tend, to some extent, to straighten the grain before it is elevated, and it also prevents any grain from falling through at this point.

This roller I is so located as not to interfere with the transit of the grain to the elevator from the carrier, and operates in such a manner as to facilitate such transit.

The butts of grain are heavier than the heads, and consequently lag behind unless some means are provided to make them move faster than the heads. In order to elevate the butts even
651 with the heads, the belt or elevator Q is so arranged that the teeth *b* will engage with the butts of the grain on the roller I and carry them up while the heads are being carried up by the elevator belts M. The lower pulley, *c*, is to be so arranged that it will permit the teeth *b* or the elevator Q to clear the end of the roller and engage the butts, and this pulley *c* is located as close to the main frame as is possible and permit the operation of the butt-elevator, which location of the pulley brings the butt-elevator in position to

enable it to catch any short grain, which short grain is liable to fall down and be caught by the heel of the sickle and clog the sickle.

By locating the lower pulley, *c*, of the belt Q at the proper
652 distance above the main frame A, the teeth *b* or the elevator will come in contact with such short grain and force it forward onto the carrier platform, thus keeping the heel of the sickle clear at this point.

As shown in the drawings in Fig. 2, the belt or chain Q is in position for elevating long grain and delivering it at the proper point for binding, in which position the lever *o* is carried away from the elevator. For elevating short grain and delivering it at the proper point, the operator takes hold of the lever *o* and pulls it towards the elevator frame, which carries the upper end of the belt or chain Q over the elevator to the proper point for elevating short grain.

653 What I claim as new, and desire to secure by letters patent, is—

1st. The roller I interposed between the foot of the elevator and the end of the carrier platform, for preventing the stoppage of grain at that point and facilitating its elevation, substantially as specified.

Erased by A, Feb. 1, 1878.

2nd. In combination with a harvester elevator, a swinging elevator pivoted at its lower end and suitable devices for shifting its upper end, whereby the swinging elevator forms a means for elevating the butts of the grain and delivering grain of different lengths at the same point, substantially as specified.

W. & B.

3rd. In a harvesting machine, a swinging belt or elevator, Q* A pivoted at its lower end, in combination with suitable devices for adjusting the belt or elevator to deliver grain at a uniform point, regardless of its length, substantially as specified.

By A, Feb'y 1, 1878, amen'd.

654

2nd. [4th.]† The adjustable elevator or belt Q, having its pulleys or wheels arranged with their faces parallel with the upper surface of the | main* A elevator [frame,]† in combination with such [frame,]† for carrying the butts up even with the heads, substantially as specified.

Erase & insert H, Nov. 23, 1878.

By A, Feb. 1, 1878, contin'd.

main elevator,*

[* In pencil in copy.]
[† Words and figures enclosed in brackets erased in copy.]
[Matter enclosed between rules erased in copy.]

Erase & insert B, Feb. 1, 1878.

5th. The elevator or belt Q, having its lower roller located at a point to permit the action of the elevator to take the short grain from the heel of the sickle, substantially as and for the purpose specified.

4th. 6th. The pivoted frame or bar *e*, supporting the elevator Q, in combination with the sliding bar *l*, rod *n*, and lever *o*, for
655 adjusting the upper end of the belt, substantially as and for the purpose specified.

5th. [7th.]* The shaft W, wheel *h*, and frame *i*, in combination with the gear wheel *g*, and pulley wheel *d*, for driving the elevator and keeping the gear wheels *g h* in gear, substantially as specified.

8th. The board R, forming a part of the cover, in combination with the elevator Q and elevator back M′, for keeping the butts from raising, substantially as specified.

Erase & insert C, Feb'y 1, 1878.

9th. The board R and arms or fingers S′ and cross-piece S, in combination with the springs or arms T, for permitting the cover to rise or fall according to the amount of grain, substantially as specified.

656 In testimony that I claim the foregoing as my own I hereto affix my signature in presence of two witnesses.

Inventor, WILLIAM F. OLIN.

Witnesses:
WILLIAM H. CALHOUN.
MERRITT GREENE, JR.

657 *Oath.*

STATE OF IOWA, }
*County of Marshall,* } ss:

On this 18th day of October, 1877, before me, the subscriber, a notary public, personally appeared the within-named William F. Olin and made solemn oath that he verily believes himself to be the original and first inventor of the within-described improvements in harvesting machines, and that he does not know or believe the same was ever before known or used, and that he is a citizen of the United States.

Inventor, WILLIAM F. OLIN.

Subscribed and sworn to before me this eighteenth day of October, 1877.

[Notarial Seal W. E. Snelling, Marshalltown, Iowa.]

W. E. SNELLING,
*Notary Public.*

*[Word enclosed in brackets erased in copy.]
[Matter enclosed between rules erased in copy.]

[Endorsed:] 5856. In the U. S. Patent Office. In the matter of the application of William F. Olin for letters patent for improvement in harvesting machine. Petition, oath, specification, and power of attorney. Filed by West and Bond, 208 La Salle St., Chicago, Ills. Patent Office, U. S. A., Nov. 13, 1877. Class 56.

658 $15, ch'k.

Memorandum of fee paid at U. S. Patent Office.
Inventor: William F. Olin.
Patent to be issued to —— ——.
Invention: Improvements in harvesting machines.
Date of payment, by mail: November 13th, 1877.
First fee: Fifteen dollars.
Check L. L. Bond, $15.00.
Solicitors: West and Bond, Chicago, Ills.

[Endorsed:] Patent Office, 1877, U. S. A., Nov. 17.

659 Room No. 41.

Compared.*

DEPARTMENT OF THE INTERIOR,
UNITED STATES PATENT OFFICE,
WASHINGTON, D. C., *Dec.* 1, 1877.

Harvester. Filed Nov. 17, 1877.

William F. Olin, care West & Bond, Chicago, Ill.:

The first claim is met in patents to Grenberg, hand binders, Mar. 16, 1869, 87770, and Chrittan, Nov. 3, 1874, 156,536 (droppers); the third, in Watson & Renwick, June 6, 1853, 9920 (self-binders); the fourth is somewhat indefinite, as the surface of the frame with which the faces of the pulleys are parallel is not indicated. The combination also is with the elevator and not the frame. The fifth is met in Seibel, Dec. 27, 1864, 45642 (hand binders), and Marsh & Marsh, June 18, 1872, 127,981 (hand binders); the eighth and ninth, in Marsh & Marsh, Jan. 5, 1864, 41080 (hand binders), Garnhart, Sept. 2, 1873, 142,331 (same), and Elward, Mar. 30, 1875, 161,396 (same).

As at present advised, the second, sixth, and seventh claims may be allowed.

ROBERT J. FISHER, JR., *2nd Ass't.*

J. G. PARKINSON, *Ex.*

[Endorsed:] No. 1. 5856. Office letter. Wm. F. Olin, Dec. 1, 1877. Class 56.

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[* In pencil in copy.]

660 Room 41.

Hon. Com'r of Patents:

*Amendment.*

W. F. Olin. "Harvester." Filed November 17, 1877.

A. Strike out 1st and 3rd claims.

4th claim, 5th line, after the word "the" insert "upper surface of the."

4th claim, 5th line, strike out the word "frame."

Strike out 5th claim and insert:

B. Erase & insert D, Sept. 24, 1878.

3rd. [5th.]† "The adjustable elevator or* A vertical belt Q, having its lower end *c* advanced in front of the line of grain travel to permit a free passage of the grain from the carrier to the elevator, substantially as specified."

Strike out 8th & 9th claims and insert:

C. Erase & insert E, Sept. 24, 1878.

6th. "[8th.]† The inclined horizontal board R, in combination with the belt Q, to prevent the grain from rising above the belt, substantially as specified."

Rearrange numerals.

WEST & BOND, *Att'ys.*

[Endorsed:] No. 2. 5856. Amendment- A, B, C. Wm. F. Olin. Feb'y 1, 1878. U. S. Patent Office, Feb. 1, 1878. Class 56.

661 Room No. 41.

Comp'd.*

DEPARTMENT OF THE INTERIOR,
UNITED STATES PATENT OFFICE,
WASHINGTON, D. C., *Feb.* 23, 1878.

Harvester. Filed Nov. 17, 1877.

William F. Olin, care West & Bond, Chicago, Ill.:

As at present advised the second amended claim may be allowed.

The third is indefinite and incorrectly describes the belt as "vertical."

[* In pencil in copy.]
[† Words and figures enclosed in brackets erased in copy.]
[Matter enclosed between rules erased in copy.]

This, besides, met in references before cited and Marsh & Marsh, before cited, for eighth and ninth.

The sixth is also rejected upon references before cited, the function of the guard board being the same as in the references, regardless of the construction or purpose of the belt.

ROBERT J. FISHER, JR., *2nd Ass't.*

J. G. PARKINSON, *Ex.*

[Endorsed:] No. 3. 5856. Office letter. Wm. F. Olin, Feb'y 23, 1878. Class 56.

662 *Power of Attorney.*

Hon. Ellis Spear, Commissioner of Patents.

SIR: We hereby constitute and appoint C. H. Watson, of Washington, D. C., as associate attorney in the matter of the application for letters patent for improvements in harvesters of Wm. F. Olin, filed November 17, 1878, with full powers to alter and amend the specification, to sign drawings, to receive the patent, if granted, and to do all and everything necessary in the premises as fully as though we were present and acting.

Respectfully, WEST & BOND.

Dated at Washington, D. C., this 17th day of September, 1878. Room 41.

[Endorsed:] 5856. Associate. Wm. F. Olin, Sept. 18, 1878. U. S. Patent Office, Sep. 18, 1878. Class 56.

663 Room 41.

Hon. Com'r of Patents:

*Amendment.*

Wm. F. Olin. "Harvesters." Filed November 17, '77. Case 5856.

Erase 3rd and 6th claims and insert:

D. By F, Nov. 23, 1878, concluded.

3rd. "The adjustable elevator or belt Q, having its lower end *e* advanced in front of the line of grain travel [in combination with the carrier]* and† in relation to the main elevator† Λ arranged Λ as described, substantially as and for the purpose set forth.

E. Erase & insert G, Nov. 23, 1878.

6th. The elevator or belt Q, in combination with the inclined board R and [carrier platform H]* main elevator† substantially as and for the purpose set forth."

C. H. WATSON,
*Asso. Att'y.*

[* Words enclosed in brackets erased in copy.]
[† In pencil in copy.]
[Matter enclosed between rules erased in copy.]

[Endorsed:] No. 4. 5856. Amendment- D, E. Wm. F. Olin, Sept. 24, 1878. U. S. Patent Office, Sept. 24, 1878. Class 56.

664 Room No. 41.

Comp'd.*

DEPARTMENT OF THE INTERIOR,
UNITED STATES PATENT OFFICE,
WASHINGTON, D. C., *Nov.* 19, 1878.

Harvesters. Filed Nov. 17, 1877.

William F. Olin, care of C. H. Watson, present:

In above case the second claim is found to have become ambiguous through amendment, and it is advised that the changes indicated in pencil thereupon should be made. Third and sixth are still indefinite. The novelty therein is in the relation of the auxiliary elevator to the main elevator, and it should appear distinctly in the claim.

In sixth the function is one conjointly to the inclined board R, the auxiliary elevator, and the main elevator.

J. G. PARKINSON, *Ex.*

[Endorsed:] No. 5. 5856. Office letter. Wm. F. Olin, Nov. 19, 1878. Class 56.

665 Room 41.

Hon. Com'r of Patents:

*Amendment.*

Wm. F. Olin. "Harvester." Filed Nov. 17, 1878.

Erase claims 2, 3, and 6 and insert:

"2nd. The adjustable elevator or belt Q, having its pulleys or wheels arranged with their faces parallel with the upper surface of the main elevator, in combination with such main elevator, for carrying the butts up even with the heads,
F. substantially as specified.

3rd. The adjustable elevator or belt Q, having its lower end, *c*, advanced in front of the line of grain travel, and arranged as described in relation to the main elevator, substantially as and for the purposes set forth.

6th. The elevator or belt Q, in combination with the in-
G. clined board R and main elevator, substantially as and for the purpose set forth."

C. H. WATSON, *Asso. Att'y.*

[Endorsed:] No. 6. 5856. Amendment- F, G. Wm. F. Olin, Nov. 23, 1878. (U. S. Patent Office, Nov. 23, 1878.) Class 56.

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[* In pencil in copy.]

666 Room No. 41.

Comp'd.*

DEPARTMENT OF THE INTERIOR,
UNITED STATES PATENT OFFICE,
WASHINGTON, D. C., *Nov. 26th*, 1878.

Harvesters. Filed Nov. 17, 1878.

William F. Olin, care C. H. Watson, present:

An interfering claim being found in a pending application, above case, although otherwise ready for issue, must be suspended to await the termination of correspondence with the adverse applicant, who has already been notified of the necessity of promptness in prosecuting his case.

J. G. PARKINSON, *Ex.*

[Endorsed:] No. 7. 5856. Office letter. Wm. F. Olin, Nov. 26, 1878. Class 56.

667 Room No. 41.

Comp'd.*

(Interference.)

DEPARTMENT OF THE INTERIOR,
UNITED STATES PATENT OFFICE,
WASHINGTON, D. C., *Jan'y 13th*, 1879.

Wm. F. Olin, care West & Bond, Chicago, Ills.:

Please find below a copy of a communication from the examiner concerning your application for patent for imp't in harvesting machines, filed Nov. 13, 1877.

Very respectfully,

H. E. PAINE,
*Commissioner of Patents.*

Room No. 41.

Your case above referred to is adjudged to interfere with the application of Albert Goodyear, of Hamden, New Haven Co., Connecticut, filed Oct. 26th, 1878—attorney, John E. Earle, of New Haven, Conn.—and the question of priority will be determined in conformity with the rules accompanying this. The preliminary statement demanded by rule 53 must be sealed up and filed on or before the 10th day of March, 1879, with the subject of the invention and name of party filing it indorsed on the envelope. The subject-matter involved in the interference is—

The combination in a grain-binder of an elevated platform for receiving the grain, apparatus for placing and securing the band

[* In pencil in copy.]

around the bundle, and an adjustable rotating guide for determining the point at which the band is passed around the stalks.

Olin's subject-matter interferes.

Goodyear's 2d claim interferes.

L. B. WYNNE, JR.,
1 *Ass't in Charge.*

[Endorsed:] No. 7. 5856. Office letter. Wm. F. Olin, Jan. 13, 1879. Class 56.

668 Room No. 41.

(Interference.)

C. DEPARTMENT OF THE INTERIOR,
UNITED STATES PATENT OFFICE.
WASHINGTON, D. C., *July* 23, 1879.

Wm. F. Olin, — C. H. Watson, present:

Please find below a copy of a communication from the examiner concerning your application, harvesting mach., filed Nov. 17, 1877, # 5856.

Very respectfully, H. E. PAINE,
*Commissioner of Patents.*

Room No. 41.

Your case above referred to is adjudged to interfere with application of Wm. McGregor & T. M. Flenniken, Rockford, Winnebago Co., Ill., filed May 12, 1879, Jacob Behel, Rockford, Ill., att'y, and the question of priority will be determined in conformity with the rules accompanying this.

The preliminary statement demanded by rule 53 must be sealed up and filed on or before the 25th day of May, 1879, with the subject of the invention and name of party filing it indorsed on the envelope. The subject-matter involved in the interference is, 1st, an endless belt moving in the direction of the grain delivery, operating in contact with the end of the grain to deliver it to a binding mechanism; McGregor & Flenniken's 1st & 3rd claims embraced in Olin's application.

669 2nd. An endless belt mounted in a swinging frame and moving therein in the direction of the grain delivery, operating in contact with the end of the grain and made adjustable to vary its inclination relatively with the direction of the grain delivery to present the grain having long or short straw centrally to the binding mechanism.

McGregor & Flenniken's 2nd & 4th claims embraced in Olin's application.

J. B. CHURCH, *Ex'r.*

[Endorsed:] No. 11. 5856. Wm. F. Olin, July 25, '79. Class 56.

670 (2-024.)

Serial No., —.

Issue division.

Room No. 122.

All communications should be addressed to "The Commissioner of Patents, Washington, D. C."

DEPARTMENT OF THE INTERIOR,
U. S. PATENT OFFICE,
WASHINGTON, D. C., *Dec.* 12, 1879.

William F. Olin, care C. H. Watson, asso., present.

SIR: Your application for a patent for an improvement in harvesters, filed Nov. 17th, 1879, has been examined and allowed.

The final fee, twenty dollars, must be paid, and the letters patent bear date as of a day not later than six months from the time of this present notice of allowance.

If the final fee is not paid within that period the patent will be withheld, and your only relief will be by a renewal of the application, with additional fees, under the provisions of section 4897, Revised Statutes. The office aims to deliver patents upon the day of their date, and on which their term begins to run; but to do this properly applicants will be expected to pay their final fees at least twenty days prior to the conclusion of the six months allowed them by law. The printing, photolithographing, and engrossing of the several patent parts, preparatory to final signing and sealing, will consume the intervening time, and such work will not be done until after payment of the necessary fees.

When you send the final fee you will also send, distinctly and plainly written, the name of the inventor and title of invention as above given, date of allowance, (which is the date of this circular,) date of filing, and, if assigned, the names of the assignees.

If you desire to have the patent issue to assignees, an assignment containing a request to that effect, together with the fee for recording the same, must be filed in this office on or before the date of payment of final fee.

Additional copies of specifications and drawings will be charged for at the following rates: Single copies, uncertified, 25 cents; twenty copies or more, 10 cents each. The money should accompany the order.

Very respectfully,

H. E. PAINE,
*Commissioner of Patents.*

[Printed on margin in red ink:] The within title is that given by the examiner in charge, as most appropriate to your invention. Should you desire a change in the same, satisfactory reasons must be given therefor on or before the payment of the final fee.

[Printed across the face in red ink:] ☞ In remitting the final fee give the serial number at the head of this notice.

Memorandum of fee paid at U. S. Patent Office.

$20 c'st.
Inventor: William F. Olin.
Patent to be issued to —— ——.
Name of invention as allowed: Harvesters.
Date of payment: December 31st, 1879.
Final fee, $20.00, twenty dollars.
Solicitors: West & Bond.
Date of circular of allowance: December 12th, 1879.
Send patent to West & Bond, Chicago, Ills.

[Endorsed:] U. S. Patent Office, Jan. 3, 1880.

671 5856. 1877. Parkinson.*
56.

No 223,812.
William F. Olin,
Of Chicago,
County of Cook,
State of Illinois.
Harvesting machines.
Hand binders.*

| | | |
|---|---|---|
| Rec'd | Nov. 13, | 1877. |
| Petition, | " | " |
| Affidavit, | " | " |
| Specification, | " | " |
| Drawing (2 sheets), | " | " |
| Model, | " | " |

Cert. dep., ——.
1. Cash, $15, Nov. 17, 1877.
Add'l fee cert., ——.
" " cash, $20, Jan'y 3, 1880.
Examined Dec. 11th, 1879. E. D. Boyd, ass't in chg.
Issue, Dec. 12, '79. Arthur A. Crossly.
Patented Jan'y 27, 1880.
Recorded, vol. —, page —.
Circular, Dec. 12, 1879.
West & Bond, Chicago, Ill.
C. H. Watson, asso., present.

672 1877. H. Edx.

*Contents.*

Application papers.
1. Rejection, Dec. 1, 1877.
2. Amendment, Feb'y 1, 1878.
3. Rejection, Feb. 23, 1878.
4. Amendment, Sept. 24, 1878.
5. Letter, Nov. 19, 1878.
6. Amendment, Nov. 23, 1878.

[* In pencil in copy.]

7. Letter, Nov. 26, 1878.
8. Letter, appl'n, Jan'y 13, '79.
9. Dec'n in favor of applicant,
10. June 18, 1879.
11. Interference, July 23, 1879.
12. Decided in favor, Nov. 14th, 1879.
13.
14.
15.
16.
17.
18.

Intf. with 9260.*

Title: Improvement in harvesters.
Ex'd: E. L. L.; K. E.

[Endorsed:] 1258. 1 D., '86.

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[* In pencil in copy.]

2 Sheets—Sheet 1.

W. F. OLIN.

Harvester.

No. 223,812. Patented Jan. 27, 1880.

No. 342 Deering v. W. H. W. Ohl } p. 673

Fig. 1.

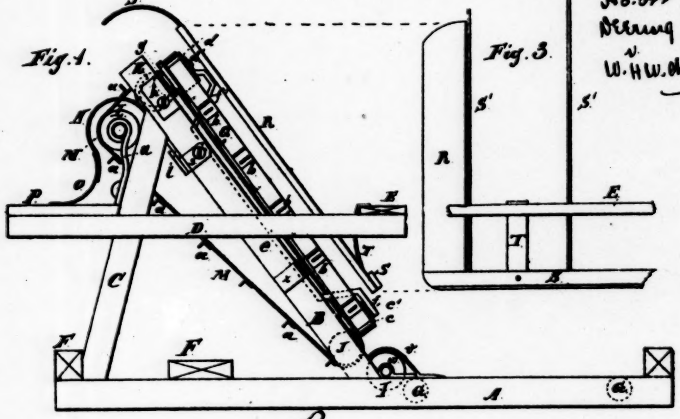
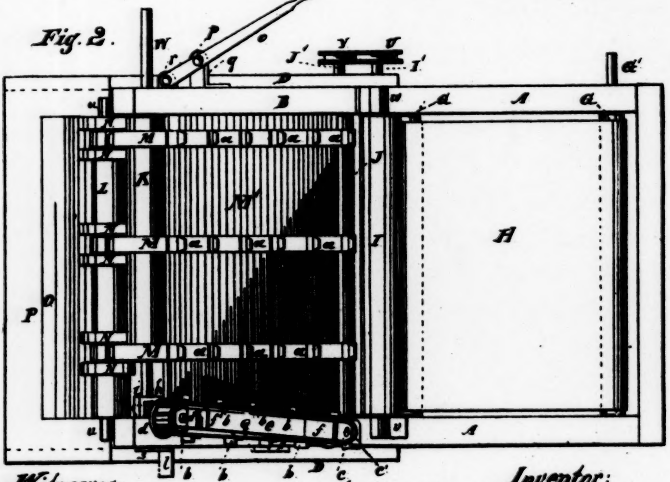


Fig. 3.



Fig. 2.



Witnesses:
O. W. Bond
Albert H. Adams

Inventor:
Wm. F. Olin
By West & Bond
Attys

2 Sheets—Sheet 2.

W. F. OLIN.

Harvester.

No. 223,812. Patented Jan. 27, 1880.

Fig. 4.

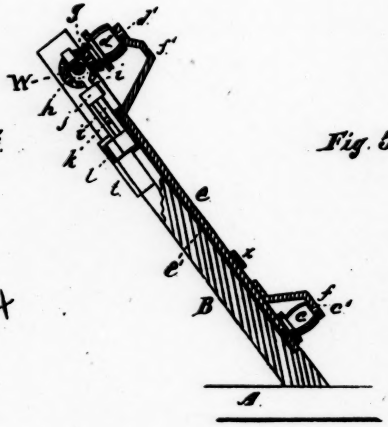
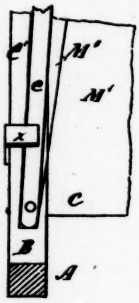



Fig. 5.




No. 322
Deering
v.
W.H.W. et al.
p. 674

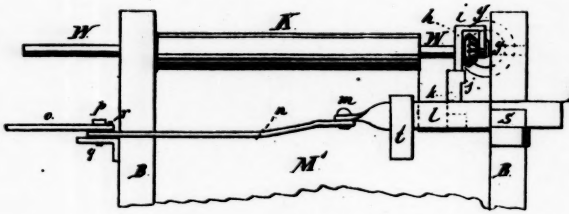



Fig. 6.

Witnesses:
O. W. Bond
Albert H. Adams.

Inventor:
Wm F. Olin
By West & Bond.
Attys.

675 UNITED STATES PATENT OFFICE.

WILLIAM F. OLIN, of Chicago, Illinois.

*Harvester.*

Specification forming part of Letters Patent No. 223,812, dated January 27, 1880. Application filed November 17, 1877.

To all whom it may concern:

Be it known that I, William F. Olin, of the city of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful improvements in harvesting-machines; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

Figure 1 is a front elevation; Fig. 2, a top or plan view; Fig. 3, a detail of the cover of the elevator; Fig. 4, a detail, in section, of the devices for elevating the butts of the grain; Fig. 5, a detail of the same parts; Fig. 6, a detail, showing the devices for shifting the butt-elevator.

In that class of harvesting machines where the grain is received upon a carrier-platform and elevated over the drive-wheel by an elevator and deliverer to the binders or an automatic binder it is desirable that there shall be no stoppage in the flow of the grain in its passage to its place of delivery; that the butts of the grain shall be carried up parallel, or nearly so, with the heads of the grain, so as to deliver the grain in proper shape for binding purposes, and that the grain shall be delivered to the receiving-table so that it can be bound at or near the middle.

The object of this invention is to provide devices for attaining all of these results; and it consists in interposing a roller between the lower end of the elevator and the inner end of the grain-carrier, to facilitate elevating the grain and prevent clogging at that point, and prevent the grain from being carried down or falling through between the elevator and carrier; in providing a belt or chain at the grain side of the machine for elevating the butts of the grain, supported on a swinging bar, so that it can be adjusted, according to the length of grain being elevated, to deliver the grain so that it can be bound at the middle; in devices for operating and adjusting the elevator for the butts; in the peculiar construction of the cover; in arranging and operating the belt for the butts so that it prevents any clogging by short grain at the heel of the sickle; in arranging the device for elevating the butts so that it will bear against the butts of the grain and crowd or move the grain back on the elevator toward the center, for the purpose of straightening the grain in its passage up the elevator, and delivering it so that it can be clasped or bound near the middle, to facilitate the ease of binding; and in the several parts and combination of parts hereinafter described as new.

(Here follow diagrams marked pp. 673 & 674.)

In the drawings, A represents the main frame; B C, the elevator-frame; D, the cross-pieces supporting the binder-table or platform or binder; E, the cross-piece secured to the cross-pieces D, and supporting the driver's seat; F, the cross-pieces between which the main or driving wheel (not shown) is located, and on which it is journaled in any suitable manner; G, the rollers for the carrier-platform; G′, the axles or shafts of said rollers; H, the carrier-platform; I, the interposed roller; I′, the shaft of the roller I; J, the lower elevator-roller; J′, the shaft of the roller J; K L, the upper elevator-rollers; M, the elevating-belts; M′, the backing-board; M″, the angular opening on the front edge of the backing-board; N, the strips of metal or fingers at the upper end of the elevator; O, the curved piece of metal supporting the fingers N; P, the platform on which the grain is delivered; Q, the belt for elevating the butts; R, the board portion of the cover; S, the cross-piece secured to the board R; S′, the spring-arms, forming the other portion of the cover; T, the springs connecting the piece S with the driver's platform; U V, the driving-pulleys; W, the shaft of the roller K; *a*, the teeth on the elevating-belts; *b*, the teeth on the butt-elevator belt; *c d*, the pulleys carrying the butt-elevator belt; *c′ d′*, the pulley-shafts; *e*, the pivoted connecting bar or strap, on which the butt-elevator pulleys are mounted; *f f′*, the caps for the pulleys *c d*; *g h*, the miter-wheels, giving motion to the butt-elevator; *i*, the sliding head or journal-support for the miter-wheel *g*; *j*, the frame or guide in which the support *i* slides; *k*, the pin for holding the head *i* in place laterally; *l*, the sliding plate or bar; *m*, the pivot for the sliding plate *l* and bar *n*; *n*, the bar connecting the
675½ sliding plate with the operating-lever; *o*, the lever; *p*, the pivot for the lever *o*; *q*, the bracket supporting the lever; *r*, the pivot at lower end of lever for connecting it to the rod or bar *n*; *s t*, the supports for the sliding bar *l*; *u*, the adjustable bearing for the lower of the upper rollers of the elevator; *v*, the curved plate at the foot of elevator over the front bearing of the roller I; *w*, journal-bearings of the roller I; *x*, the plate or catch for holding the bar *e* in place and preventing it from rising.

The parts A, B, C, D, E, F, G, G′, and H may be of any of the ordinary forms of construction, and the complete machine is to be provided with a drive-wheel, sickle, divider, grain-wheel, and suitable gearing for operating the several parts; but as these parts may be of any of the usual forms of construction, they are neither shown nor described.

The lower elevator-roller, J, is suitably journaled, near the lower end of the elevator, in the pieces B of the elevator-frame. Between this roller J and the inner roller of the carrier-platform is another roller, I, so located and arranged as to permit and aid the passage of the grain from the carrier-platform to the proper position to be taken by the elevating belts or devices, and prevent the grain from falling through at that point. This roller, as shown, is journaled in suitable bearings *w*, secured to the main frame A, and its shaft I′ projects some distance beyond the rear of the frame, and is provided with a pulley, U, by means of which the roller is driven. The

roller J is so arranged in relation to this interposed roller I that the teeth *a* of the elevating-belts M will just clear the roller I.

The shaft J′ of the roller J extends beyond the elevator-frame, and is provided with a pulley, V, for driving the roller J.

The elevating-belts M pass over the roller J at the bottom and over the rollers K L at the top of the elevator-frame. These belts M are provided with teeth or pins *a* for engaging with and elevating the grain, and by passing the belts over two rollers, K L, at the top, as shown, instead of one, a positive downward movement is given to the grain, which greatly facilitates its delivery upon the receiving-table or grain-receptacle.

The receiving-table P, as shown, is located on the cross-bars D, and to it is secured a curved piece of metal, O, so arranged as to prevent the grain on the table from falling back into the machine beneath the elevator. To this curved piece of metal O are secured springs or fingers N, so arranged and formed as to extend up and over the lower one of the upper elevator-rollers, L, the object of which fingers is to prevent the grain from going between the two upper rollers, and also to insure its delivery to the binder.

The butt-elevator belt is provided with suitable teeth *b*, and is located on top of the forward piece, B, of the elevator-frame, and is supported and driven by two pulleys, *c d*, which have their faces or sides parallel with the top of the piece B. These pulleys *c d* are connected together by the piece *e*. This piece *e* may be located in a groove, *e′*, formed in the piece B, which groove is of such form as to permit the piece *e* to move backward and forward, or may be located directly on top of the piece B. The shaft *c′* of the wheel *c* has its lower bearing in the piece B and its upper one in the cap or bent-up bar *f*, which bar or cap is permanently secured, as shown, to the bar or strap *e*. This shaft *c′* also forms a pivot for the bar or strap *e* to swing on. The upper bearing for the shaft *d′* of the pulley *d* is in the bent-up portion or cap *f′* of the strap *e*, and to the lower end of this shaft *d′* is secured a miter-wheel, *g*, which gears with a similar miter-wheel, *h*, secured to the shaft W of the roller K. On the shaft W, and sliding thereon, is a piece of metal, *i*, so formed as to have two arms parallel to each other and a connecting-piece. The arms of this piece *i* are located on the shaft W, and between them is the wheel *h*, so that this piece *i* is above and on each side of the wheel *h*, and forms a guard therefor, to prevent any grain from becoming entangled therein. In the outer arm of this sliding head *i* is the journal-bearing for the lower end of the shaft *d′* of the pulley or wheel *d* for the upper end of chain Q, so that as the head *i* is moved back and forth on the shaft the upper end of this belt Q must be carried with it, by reason of the journal-bearing for the shaft *d′* being in the sliding head.

By locating the wheel *h* between the arms of the sliding head and journaling the wheel *g* thereto, as shown and described, it will be seen that the wheels *g h* must be in gear, no matter what the position of the upper end of Q may be.

The inner arm of the sliding head *i* extends some distance below the shaft W, and enters a suitable guideway in the support or frame

*j*. As shown, this arm passes between a pin, *k*, secured to *j* near its middle, and ears or projections formed on the edge of *j* at the top and bottom, so that this arm can slide up and down to some extent, but has no lateral play.

The guide or support *j* is permanently secured to the bar *l*, which bar moves forward and back in the bearings or guides *s t*, one of which, *s*, is secured to the piece B, and the other, *t*, to the backing M′ of the elevator. To the inner end of this bar *l* is pivoted, at *m*, a bar or rod, *n*, which extends across the elevator and projects some distance beyond the elevator-frame, and to its outer end is pivoted, at *r*, the lever *o*, which lever is supported on a bracket, *q*, attached to the piece B, and is held in place thereon by the pivot *p*.

The roller L is journaled in adjustable bearings *u*, secured to the pieces C of the elevator-frame, by means of which the belts M can be kept at the proper tension.

As shown, the forward bearing of the roller I is covered with a curved piece, *v*; but in practice this piece may be dispensed
676 with and the bearing so formed as to accomplish the same purpose of permitting the grain at that point to pass up so as to be reached by the teeth *b* of the belt Q.

The rollers G I J K L are to be driven by means of suitable belts and pulleys operated from the main or drive wheel.

It will be seen that as the lever *o* is moved to or from the driver it will carry the upper end of the elevator Q out or in, as desired, by reason of the connecting-rod *n*, sliding bar *l*, supporting frame or piece *j*, sliding head *i*, gear-wheels *g h*, and shaft *d*′, and as the upper end of the belt or elevator is carried in or out it will describe an arc of a circle, so that the pulley *d* will be carried up and down slightly, carrying with it the gear-wheel *g*. The sliding head *i* must, therefore, be so arranged and connected to the shaft W and the devices for sliding it that it will be self-adjustable, in order to allow the upper end of the elevator or belt Q to operate.

The cover for preventing the grain from being blown away as it is elevated consists of the board R and spring-arms S′. The board R is located over the belt or elevator Q, and is so arranged as to keep the butts of the grain down, so that the belt can elevate them and at the same time permit their easy passage up the backing-board M′. To the lower end of this board R is secured a cross-piece, S, which is connected and supported from the driver's platform by means of spring-arms T. This arrangement permits the cover or arms S′ to yield according to the amount of grain being elevated.

The backing-board M′ is secured to and between the posts or pieces B in any suitable manner, and is so arranged as to permit the easy passage of the grain, the grain in its passage being between this backing-board M′ and the cover R S′. The front edge of this backing-board M′ is provided with an angular recess, M″, formed by cutting out a portion of its upper face, as shown in Figs. 2 and 5, so that the backing-board will not interfere with the swinging of the belt or elevator Q on its pivot.

The backing-board M′ might be so arranged as to dispense with the recess M″; but by using this recess M″ it permits the lower

edge of the butt-elevator to come below the upper line of the backing-board, so as to insure its engagement with all the butts of the grain and prevent the grain from getting between the backing-board and butt-elevator.

The elevator or belt Q can be used with other forms of elevators than the one shown to accomplish the same results, the belt being so arranged in relation to such elevator as to run with its edge parallel with the upper face of the backing-board or elevator.

As shown, the frame or support for the elevator or belt Q is pivoted at the lower end of the elevator-frame and has its driving mechanism located at the upper end; but the driving mechanism may be located at the lower end of the belt Q or elevator, if desired.

As shown, the butt-elevator Q consists of a belt, Q, provided with suitable teeth *b*, operated by pulley-wheels; but a chain provided with teeth or not, operated by suitable sprocket-wheels at the upper and lower ends, might be used in place of the belt.

By arranging the pulleys *c d* so that their flat faces will be parallel with the top surface of the elevator-frame, the butt-elevator will be operated so that its face will strike against the end of the butts of the grain when elevating the butts; and by supporting the butt-elevator on a frame or support pivoted at its lower end and free to swing back and forth at its upper end, the elevator can be so adjusted as to cause the grain to be delivered at one point, no matter what the length may be, for as the butts are carried up by the elevator the grain will be forced back toward the middle of the elevator by reason of the belt or chain striking against the ends of the butts and forcing them back, so that by this arrangement of the butt-elevator it not only serves the purpose of elevating the grain, but also acts as means to cause the grain in its passage up the elevator to be carried back, so as to deliver it at one point, regardless of its length, the upper end of the butt-elevator being carried in or out as the grain is short or long.

For delivering long grain in proper position for binding purposes the belt or elevator Q is to be so arranged that its upper end will be over, or nearly over, the piece B, in which position the elevator will operate on a line with, or nearly with, the front of the backing M′, and the grain will be carried up thereby, so as to deliver it at a point where it can be clasped and bound at or near the middle.

For delivering medium grain the upper end of the elevator Q is to be carried or swung over the backing or elevator the required distance, and then, as the grain is carried up the elevator, the action of the face of the elevator or belt striking the ends of the butts will force the grain back, as it ascends, toward the middle of the backing or elevator; and this carrying or forcing endwise of the grain will continue until it has reached the top of the elevator Q, when it is in proper position to be delivered at the same point as the long grain, so that it can be clasped or bound near or at the middle.

For delivering short grain the upper end of the elevator Q is carried still farther over the backing or elevator for the grain, which makes the angle at which it stands greater, and forces the grain, as it ascends, still farther back on the backing or elevator by

the action of belt or elevator Q on the ends of the butts, so that short grain will be carried up the elevator and delivered at the same point as before, so that it can be clasped or bound at or near the middle.

The upper end of the elevator Q is shifted to bring it to the desired position to deliver long, medium, or short grain by the
676½ operator, who takes hold of the lever *o* and moves it toward or from the elevator-frame. As the upper end of the lever is moved away from the frame its lower end will be carried in, and, carrying with it the rod *n*, will slide the plate or bar *l* forward, carrying with it the support or frame *j*, with which the sliding head *i* is connected, which head will be moved forward on the shaft W, carrying with it the gears *g h*, and through the shaft *d'*, the upper end of the elevator Q, bringing the parts into the position shown in Fig. 2.

When the upper end of the lever *o* is carried toward the driver its lower end is carried out, carrying with it the rod *n* and sliding bar or plate *l* and frame or support *j*, which moves the sliding head *i* back on the shaft W, and with it the gears *g h*, and, through the shaft *d'*, carries the upper end of the elevator Q over the backing or elevator to any desired position to deliver the grain at a point where it can be clasped or bound at or near the middle.

By this arrangement the grain as it is being elevated will be carried back or endwise, so that the middle of the grain will always come to the same point, no matter what the length of the grain may be, and so that it will be delivered in such a position that a binder who stands at a given place or point can clasp the sheaf in the middle and bind it without the necessity of shifting his position to accommodate himself to the delivery of the grain, and by thus delivering all lengths of grain at a uniform point the ease with which it is bound is greatly facilitated; and in case an automatic or self binder is used, it can be arranged stationary at the point to bind the grain properly, and the grain will be carried up and delivered at that point, so as to enable it to be bound by the self-binder at or near the middle, so that all devices which are now used for the purpose of adjusting a self-binder to the position to enable it to bind the grain properly are dispensed with, as the grain, whether long or short, will be delivered at the same point by shifting the upper end of the butt-elevator, as before described.

By this arrangement all the devices for effecting a fore-and-aft adjustment for binding purposes are dispensed with, and the same means employed for elevating the butts also afford the means for properly delivering the grain, and such delivery is effected during the transit of the grain up the elevator.

The elevator Q need not extend the entire length of the elevator, but may stop some distance below the upper elevator-roller, as the grain, after it is once forced to the proper point on the elevator, will be carried up and delivered in that condition.

In operation, the grain, as it falls upon the carrier-platform H, is carried forward to the roller I, which also being in motion carries the grain up over it, when it is received by the teeth *a* of the eleva-

tor-belts, and by the belts M carried up and delivered to the receiving platform or table.

As machines have been heretofore constructed, the grain as it passes to the foot of the elevator was liable to stop and accumulate at that point, which prevented the easy elevation of the grain. By interposing the roller I between the foot of the elevator and the end of the carrier, as shown, it will be seen that no grain can accumulate at that point, as the roller I will move it forward and over the roller under all circumstances, thus keeping the grain constantly in motion at the foot of the elevator, so that it cannot become tangled or accumulate and clog the elevator, and this roller I, by reason of its revolving, will also tend, to some extent, to straighten the grain before it is elevated, and it also prevents any grain from falling through at this point. This roller I is so located as not to interfere with the transit of the grain to the elevator from the carrier, and operates in such a manner as to facilitate such transit.

The butts of grain are heavier than the heads, and consequently lag behind unless some means are provided to make them move faster than the heads. In order to elevate the butts even with the heads the belt or elevator Q is so arranged that the teeth *b* will engage with the butts of the grain on the roller I and carry them up while the heads are being carried up by the elevator-belts M. The lower pulley, *c*, is to be so arranged that it will permit the teeth *b* on the elevator Q to clear the end of the roller and engage the butts, and this pulley *c* is located as close to the main frame as is possible and permit the operation of the butt-elevator, which location of the pulley brings the butt-elevator in position to enable it to catch any short grain, which short grain is liable to fall down and be caught by the heel of the sickle and clog the sickle. By locating the lower pulley, *c*, of the belt Q at the proper distance above the main frame A the teeth *b* on the elevator will come in contact with such short grain and force it forward onto the carrier-platform, thus keeping the heel of the sickle clear at this point.

As shown in the drawings, in Fig. 2, the belt or chain Q is in position for elevating long grain and delivering it at the proper point for binding, in which position the lever *o* is carried away from the elevator. For elevating short grain and delivering it at the proper point, the operator takes hold of the lever *o* and pulls it toward the elevator-frame, which carries the upper end of the belt or chain Q over the elevator to the proper point for elevating short grain.

What I claim as new, and desire to secure by letters patent, is—

1. In combination with a harvester-elevator, a swinging elevator pivoted at its lower end and suitable devices for shifting its upper end, whereby the swinging elevator forms a means for elevating the butts of the grain and delivering grain of different lengths at the same point, substantially as specified.

677 2. The adjustable elevator or belt Q, having its pulleys or wheels arranged with their faces parallel with the upper surface of the main elevator, in combination with such main elevator,

for carrying the butts up even with the heads, substantially as specified.

3. The adjustable elevator or belt Q, having its lower end, *c*, advanced in front of the line of grain travel, and arranged as described in relation to the main elevator, substantially as and for the purposes set forth.

4. The pivoted frame or bar *e*, supporting the elevator Q, in combination with the sliding bar *l*, rod *n*, and lever *o*, for adjusting the upper end of the belt, substantially as and for the purpose specified.

5. The shaft W, wheel *h*, and frame *i*, in combination with the gear-wheel *g* and pulley-wheel *d*, for driving the elevator and keeping the gear-wheels *g h* in gear, substantially as specified.

6. The elevator or belt Q, in combination with the inclined board R and main elevator, substantially as and for the purpose set forth.

In testimony that I claim the foregoing as my own I hereto affix my signature in presence of two witnesses.

WILLIAM F. OLIN.

Witnesses:
WILLIAM H. CALHOUN.
MERRITT GREENE, JR.

678 (2–175.)

18819.

DEPARTMENT OF THE INTERIOR,

[Vignette.]

UNITED STATES PATENT OFFICE.

To all persons to whom these presents shall come, Greeting:

This is to certify that the annexed is a true copy from the files of this office of the file-wrapper and contents in the matter of the letters patent granted John F. Steward February 20, 1883, number 272,598, for improvement in grain-binder.

Seal Patent Office, United States of America.

In testimony whereof I, M. V. Montgomery, Commissioner of Patents, have caused the seal of the Patent Office to be affixed this 3d day of October, in the year of our Lord one thousand eight hundred and eighty-five, and of the Independence of the United States the one hundred and tenth.

M. V. MONTGOMERY,
*Commissioner.*

679 1 dr., 2 sheets.

To the Commissioner of Patents:

Your petitioner, John F. Steward, a citizen of the United States, residing at 410 Seminary avenue, in the city of Chicago, in the county of Cook and State of Illinois, prays that letters patent be

granted to him for the improvement in grain-binders set forth in the annexed specification.

JOHN F. STEWARD.

680 To all whom it may concern:

Be it known that I, John F. Steward, of [410 Seminary avenue in]* the city of Chicago, county of Cook and State of Illinois, have invented certain new and useful improvements in grain-binders, of which the following is a full specification, reference being had to the accompanying drawing, in which—

Fig. 1 is a rear (end) A view of the frame-work of the harvester, showing the binder in its proper relation thereto. Fig. 2 is an A [outside]* or stubble [end]* (outer) (side) A view of the same. Fig. 3 shows the parts as viewed from a point A at right angles to the decking of the binder. Fig. 4 shows the various positions assumed by the parts that constitute my invention. Figs. 5 A 6 [& 7]* are details. A

Erase & insert by A, Nov. 6, 1882.

(above and in a line)

(and) (Fig. 7 shows a modification.)

The object of my invention is to provide means that, combined with an [otherwise]* automatic grain-binder A [shall give it the ability also to]* automatically regulate the position of the band on the A [bundle]*—that is, shall automatically place the band upon the A [bundle]* in its proper position relative to the length A [thereof]* without any aid or attention from the operator; and its nature consists in locating in A a position as to be influenced by the heads of the [straw forming the swath]* A a device to be moved thereby, the said device connected with means for adjusting the relative positions of the said A [swath]* and A binding mechanism. Under the principle involved many

By A, Nov. 6, 1882.

(shall) (make it)

By A, Nov. 6, 1882.

(gavel)

By A, Nov. 6, 1882.

(of the grain)

(such)

(incoming grain *as* gavel or bundle,)

(grain) (the)

681 methods may be resorted to to attain the result. I have selected and developed what appears to me to be the most feasible plan. Several subordinate ends are reached by the different elements of the device, which will be pointed out. My invention is capable of being A [adapted]* to any form of binder, but I here show it A [conformed]* to one now much used. I will describe the binder only so far as is necessary [for]* A a correct understanding of my improvement.

(applied)

(applied)

(to)

In the drawings, A is the frame-work of the harvester, upon which

[* Words and figures enclosed in brackets erased in copy.]

platform
the binder is mounted, *b* [swinging]* ʌ canvas, *b'* and $b^2$ the elevating canvases. C is the chute board or decking onto which the
and it is
[swath of]* grain is deposited in a loose state by the elevators, ʌ slotted to permit the packers and needle to work through it. D is
grain
the ʌ adjusting mechanism, consisting of a frame carrying a roller
rollers
at each end, around which ʌ is drawn the endless canvas *d*. The larger or upper[most]* roller is driven from the gearing of the harvester in the usual manner and moves in the direction indicated
adjuster
by the arrow in Fig. 3. The ʌ frame vibrates on the axis of
upper and
this ʌ driving roller. So far the adjusting and butting mechanism
no
does not differ from many in use and [does not]* constitutes ʌ [any]* part of the present invention only as combined with other elements. $d^3$ is an arm secured to the top of the
with
682 post $A^2$, overreaching the decking parallel there[to,]* ʌ and
arm
to this ʌ above and to the deck below is pivoted the swinging frame D. *d'* is a thin board or plate of metal, as wide as the
and lower
adjusting canvas ʌ pivoted to the frame of the latter at its ʌ [lowest]*
inward
extremity. From this board reaches upward and ʌ [backward]* (see Fig. 3) an arm, $d^2$. The board and arm are as one piece, but the
greater
board itself is made in two parts, so that its ʌ [greatest]* portion
which is end of the $d^2$
(ʌ the lower) [most]* can be removed. Near the ʌ arm ʌ is pivoted
arm $d^2$
the bar $d^4$, connecting the [latter]* ʌ with the overreaching arm $d^3$ [near]* near its top. In this arrangement we have four pivots, numbered 1, 2, 3, & 4. The distance between 1 & 2 is equal or
to
nearly so [with]* ʌ that between 3 & 4, and the distance between 1 & 4 to that between 2 & 3. In effect, then, the parts D, $d^2$, $d^3$, & $d^4$
and
describe a quadrilateral having substantially equal ʌ parallel sides, so that, to whatever point the frame D is swung in its adjustment,
the arm
ʌ $d^2$ will remain parallel with the fixed arm $d^3$, and [that]* the board
edge
*d'* will always remain parallel with the ʌ [sides]* of the decking close to and over which the whole vibrates. $d^5$ is a connecting rod, pivoted at $d^6$ to the frame D, the adjustment of which it controlls, and reaches upward and backward over the decking, passing
683 near the top rail, $A^3$, of the harvester frame. It is provided with the holes $d^7$ at a point where it passes the top rail, in
latter so that
which ʌ holes are also provided, ʌ [and]* by means of a pin pass-
through
ing ʌ [over]* one and entering the other the whole device can be

[* Words enclosed in brackets erased in copy.]

secured in any position [of adjustment]*; but it must be remembered that this means for securing the parts in place is but for use hereinafter in special cases, which will be ʌ pointed out.

The board $d'$ is of such length as to [bea-]* reach as low as the accumulating gavel and prevent the grain ʌ [straw]* working or jarring

By C, Nov. 6, 1882. forming it while accumulating [it]* from ʌ [chucking] forward. The butting or adjusting mechanism is given an amount of variation in its [positions of]* adjustment from a line parallel with ʌ and over the front ʌ edge of the chute board to a point so far [inward]* backward ʌ as to car-y [a swath of]* short grain sufficiently far back to be bound centrally. 3 positions are shown in Fig. 4. $e$ is a board or plate of metal nearly equal in width to that of the adjusting canvas $d$. It is pivoted to the post A' of the harvester by any suitable means. I show it hinged to a plate, $e^3$, bolted to the said post. It lies ʌ [lays]* in a position to the deck or chute board corresponding with that of the adjusting canvas. This board or plate is nearly straight from the pivotal

684 point downward to nearly its lower extremity, where it curves forward toward the bundling devices and then ʌ [thence]* backward. The form may be much varied, but I consider the curvature here given best. When the [bundle]* gavel ʌ is in the position [occupied by it when being]* to be ʌ bound it is still just above the curve in the plate, as seen in Fig. 3. $e'$ is a spring secured at one end to the upper edge of the board $e$ at about [its]* the ʌ middle of its length, ʌ the other end of the said spring being attached to a bolt, $g$, adjustable in a slot in the bar $g'$ of the frame-work of the binder. By this means the plate $e$ is caused to press elastically toward the grain ʌ [swath and bundle]* when not restrained by locking mechanism hereinafter explained, and the elastic pressure is ʌ adjustable as circumstances may require. $e^2$ is an arm secured to the board $e$ at its upper edge and near its top or hinged end, the said arm reaching upward over and parallel with the decking and connecting by a joint with the rod $d^5$. By this means the movement of the board or plate $e$ is transmitted to the adjuster D, ʌ [but re- so that it moves in a reverse direction.

By A, Nov. 6, 1882. versedly so.]* In other words, the two operating one on the heads and the other on the butts of parts, ʌ [spanning]* the grain, are so connected that they approach or ʌ [and]* recede from each other when

685 one is ʌ moved. These parts, because of their weight, are inclined to swing apart, and [from another score, that]* also because ʌ of the tendency of

[* Words enclosed in brackets erased in copy.]

the motive power on the canvas *d* to swing its frame outward, and hence the spring *e'* must be strong enough to overcome these tendencies and as much stronger A [more]* as [it]* is wished to have the parts moved quickly by the said spring when it is at liberty to move them. With the above-described parts in the positions shown in Fig. 3 and the bundle as there shown, it is plain that if the bundle is quickly ejected it must engage the curved part of *e* and force it out of its way, and hence backward, and the butting canvas being connected thereto it will be moved forward. Two forces, then, are apparent—the bundle to force the parts opposing its head and butt A [spanning it]* from each other and the spring to retract A [contract]* them. In order that each bundle shall leave A [leave]* the parts fixed for the time being in any position it may have caused them to assume, I provide a locking device that shall at all times retain the parts, except just while the head of each bundle is passing the curve on the plate *e*, which device is constructed as follows:

By A, Nov. 6, 1882.

From the arm *i* of the binder frame (cut away in Fig. 2 to show the latching device) I depend a support, $f^6$. To this is pivoted the lever *f*, which lever is notched upon its lower edge. The position of this lever is such that its notched edge rests upon the upper edge of *of* the plate or board *e*. From its pivotal point this lever reaches forward a short distance to the disc $f^3$ and is provided with an anti-friction roller, $f^5$, which is engaged and moved by the cam $f^4$ on the said disc, the latter being keyed to the knotter driving shaft, which makes one complete revolution to each operation of the binding mechanism. The lever is thus lifted from off the plate A [*lurking*]* *e* once in each revolution for an instant. The time of this lifting is made to correspoud with the action of the discharge arms *j'* and *k*, so that when they have engaged the bundle to eject it the plate A *e* shall be free to respond to any pressure of the bundle while the latter is passing its curved end. $f^2$ is a spring acting upon the latch lever *f* A to return it quickly to its place for engagement with the plate *e* after being acted upon by the cam $f^4$. *m* is the breast plate between the tying mechanism (not shown) secured to it and the being bound. [swath of]* grain A *l* is a slot for the passage of the needle. *j* is the knotter rotating gear, to which A [it]* is secured the discharge arm *j'*. To the disc $f^3$ is secured the discharge arm *k*.

686

Before describing the operation of the parts conjointly I wish to state that certain parts of my A [in this device I have

By A, Nov. 6, 1882. 687

[* Words enclosed in brackets erased in copy.]

By A, Nov. 6, 1882, concluded.

three distinct]* inventions ^ are capable of use singly as well ^ as conjointly, and I will first point out such independent action, believing that their joint action will be more quickly understood.

Firstly. If the pivot bolt connecting $e^2$ and $d^5$ and the locking device be removed and a pin is inserted into the holes in the top rail and through the holes $d^7$ in the connection $d^5$ I have ^ an adjustable butting mechanism, supplemented by the board $d'$, for preventing the gavel from ^ [chucking]* working. ^

Ex'r erased "chucking."

Erase here by insert L, Dec. 1, '82.

With the same parts removed ^ Secondly. ^ I have an elastically swinging board for ^ directing [conveying]* scatterings caused by imperfect adjustment of the reel of the harvester or any other cause into the gavel, whether the ^ grain [latter]* be long or short. ^

B, Nov. 6, 1882.

By B, Nov. 6, 1882, concluded.

Insert C, Nov. 6, 1882.

With the parts all connected as best shown in Figs. 2 and 3, I have, as before stated, a device for regulating the [relative]* position of the [swath of]* grain ^ relative to the [and]* binding mechanism, the operation of which I will now describe. ^

Insert G, Nov. 6, 1882.

The cut grain falls on the platform canvas and is conveyed to and elevated by the elevating canvases and delivered in a loose state onto the ^ table [primary receptacle in the form of a swath]* when it is engaged by the usual pushing mechanism and forced ^ forward to the binding mechanism, [into the secondary receptacle]* where it is bound and from which it is finally ejected by the discharge arms or other means.

Erase & insert by I, Dec. 1, 1882.

By C, Nov. 6, 1882, concluded.

688 With the butting mechanism and the board or plate $e$ in their positions nearest approaching each other we will suppose the grain first acted upon to ^ reach [find]* them.

By C, Nov. 6, 1882.

If the grain is long the head of the bundle when discharged will press forcably against $e$, more especially against its curve, and force it backward, it being at the proper instant permitted to move by being unlocked by the action of the cam $f^4$. The first bundle, thus bound, may be carried too far backward in its approach to the binding mechanism ^ and hence bound too near the butt, but when it is discharged the ^ butt-adjusting [butting]* device acts under

By C, Nov. 6, 1882.

[* Words enclosed in brackets erased in copy.]

the influence of the plate *e* and is hence moved forward to a position [of adjustment]* more nearly in keeping
and the next bundle will be bound further from the butt.
By C, Nov. 6, 1882. with the requirements, ʌ

If when going into a field of short grain
butt-adjusting
By C, Nov. 6, 1882. the ʌ [butting]* mechanism and plate *e* are wide apart the first bundle will be deposited too far forward in the receptacle and hence bound too near the heads, but upon its discharge the board *e* will be permitted
or swing with a quick movement
By C, Nov. 6, 1882. to jump ʌ to a position as far forward as
position
the ʌ [p——]* of the bundle at that instant
will
will permit, and hence the butting mechanism ʌ be set for short grain. If the device is set to proper position for the first bundle before going into the grain it will be properly bound and it will leave the parts in position for the
Insert D, Nov. 6, 1882. 689 succeeding one. ʌ

It may seem to those theoretically versed in the art, yet unfamiliar with the operation of harvesting machinery in actual work, that the adjustments will not be perfect, but when the fact is taken into account that the change of length
grain which
By C, Nov. 6, 1882. of [straw that]* ʌ the machine advances to
generally
meet is ʌ gradual, and that the gavels
in length gradually
By C, Nov. 6, 1882. increase and decrease ʌ [by the slow growth, as it were,]* the movement imparted to the regulating device will be competent to do its work, which it does in practice to a remarkable degree.

The modifications that may be made in this arrangement are almost unlimited. For instance, the butting device may be of any kind competent to give the swath direction into the receptacle or it may be of the kind that moves the gavel bodily endwise. The board or plate *e* may be connected with the butting mechanism in
and the plate
various ways, ʌ *e* itself may be varied, yet should any device be used capable of being influenced by the heads of the grain, whether in swath, gavel, or bundle, for the purposes set forth I should consider it an equivalent. The spring *e'* may be connected with the butting mechanism direct as to any of the moving parts. The locking arrangement may be varied and even dispensed with under some circumstances.

690 These suggested modifications are shown in an additional figure, that numbered 7.

grain
In this the ʌ [swath itself]* is shown
operated at each end
By C, Nov. 6, 1882. as [spanned]* ʌ by the two plates or boards, and it is plain that as the distance between these boards at their

[* Words enclosed in brackets erased in copy.]

delivery end is regulated by the length of the grain the butt-board

By C, Nov. 6, 1882. will be caused to deliver the incoming grain ʌ [swath]* properly. This would be used in that class of binders where the grain accumulates in the receptacle in a free state and is taken bodily therefrom by the needle.

The plate *e* may be located upon the elevator and connected with

Insert E, Nov. 6, 1882. the adjusting or butting mechanism and produce the same effect. ʌ

691 What I claim is—

Erase & insert F, Nov. 6, 1882. 1st. In a grain-binder, means substantially [such]* as described, combined with the heads of the moving grain, as and for the purpose described.

By F, Nov. 6, 1882. By F, Nov. 6, 1882. 2nd. The combination of the adjusting mechanism ʌ [butting]* of a grain-binder with means, substantially automatically setting the adjuster for directing ʌ such as described, for ʌ [regulating the adjustment of]* the grain into the binding mechanism, as set forth.

By F, Nov. 6, 1882, concluded. 3d. The combination of the swinging for advancing the butt of the grain, for retarding the heads of the same. revolving canvas, ʌ with the board *e*, ʌ

Insert H, Nov. 6, 1882. Erase by J, Dec. 1, 1882. 4th. The butting canvas *d*, ʌ and plate for advancing the butts of the grain, for retarding the heads of the same, or board *e*, ʌ combined with the chute-board C, substantially as described.

By H, Nov. 6, 1882. Insert N, Dec. 1, 1882. 4. [5th.]* The combination, with the delivery ap-aratus of a [self-binding]* harvester, of a self- setting ʌ [adjusting]* plate, *e*, directing for ʌ succeeding [conveying]* scattering grain into the ʌ gavel, substantially as described.

By N, Dec. 1, 1882. By H, Nov. 6, 1882. 5. [6th.]* The combination, with ʌ [of]* the harvester of setting ʌ delivery apparatus, ʌ the self- ʌ [adjusting]* plate *e*, and the spring *e'*, adjustable in its tension, substantially as described.

By J, Dec. 1, 1882, contin'd. 7th. The combination of the chute-board & the board or plate *e*, provided with the spring *e'*[2,]* adjustable as to its tension, substantially as described.

[* Words and figures enclosed in brackets erased in copy.]
[Matter enclosed between rules erased in copy.]

6. [8th.]* The combination of the board $e$, spring $e'$[,]* bolt $g$, and slotted bar $g'$, substantially as described.

Erase & insert K, Dec. 1, 1882.
By H, Nov. 6, 1882, contin'd.

9th. The combination, with the ʌ [swath grain acted upon, setting butt-adjusting butting]* of grain,]* of the self- ʌ [adjusting]* ʌ mechanism, substantially as described.

692 By H, Nov. 6, 1882.

8[10]*th. The combination, with the ʌ [delivery]* harvester delivering ap-a- and ratus ʌ the elastically yielding [butting]* butt-adjusting ʌ mechanism, of means, substantially such as described, for varying the stress of elasticity, as set forth.

By N, Dec. 1, 1882, concluded.

9. [11th]*. In combination with the ʌ bundle- discharging mechanism of a grain-binder, the board $e$, for the purposes set forth.

By H, Nov. 6, 1882.

10. [12th.]* The combination of the discharge arms, the board $e$, and the [butt- butt-adjusting ing]* ʌ mechanism, substantially as described.

By H, Nov. 6, 1882.

11. [13th.]* The combination of the self- ʌ setting [adjusting]* board $e$ and locking mechanism, substantially as set forth.

By H, Nov. 6, 1882.
By J, Dec. 1, '82.
By H, Nov. 6, 1882, contin'd.
Contin'd.
Ex'r.

14th. In a grain-binder, [butting]* butt-adjusting ʌ mechanism capable of adjustment, in combination with the ʌ spring $e'$ board $e$ and ʌ [swath passing for the or bundle of]* grain, ʌ producing ʌ [said]* of the butt-adjuster. adjustment ʌ

12. [15th.]* The plate or board $e$ and connecting mechanism as means for transmitting the power exerted

By H, Nov. 6, 1882.

by the spring $e'$ and swath or bundle of grain to the ʌ [butting]* butt-adjusting mechanism, substantially as described.

13. [16th.]* The combination of the spring latch with the board $e$, substantially as described.

14. [17th.]* The combination with ʌ [of] the board $e$ of the ʌ butt- adjusting [ing]* ʌ the board- mechanism and ʌ locking mechanism, substantially as described.

[* Words and figures enclosed in brackets erased in copy.]
[Matter enclosed between rules erased in copy.]

15. [18th.]* The combination of the [of the]* board *e* and [butting]* butt-adjusting ʌ mechanism with intermittantly operating [locking]* for locking the board *e*, mechanism, ʌ substantially as described.

By H, Nov. 6, 1882, contin'd.

16. [19th.]* The elastically yielding [butting]* butt-adjusting ʌ mechanism, in combination with locking mechanism, substantially as described.

693 By H, Nov. 6, 1882.

17. [20th.]* The combination, with the setting butt-adjusting self- ʌ [adjusting butting]* mechanism, of the latch *f* and cam $f^4$, substantially as described. [*f*]*

By H, Nov. 6, 1882.

18. [21st.]* The combination of the board *e*, arm $e^2$, connecting rod $d^5$, [adjusting or]* butt-adjusting ʌ [butting]* mechanism, and board *d'*, substantially as described.

By H, Nov. 6, 1882.

19. [22nd.]* The combination of the board *e* and board *d'*, substantially as described.

20. [23d.]* The combination, in a grain-moving butt-adjusting binder, of [butting] ʌ mechanism and the board *d'*, substantially as described.

By H, Nov. 6, 1882.

21. [24th.]* The ʌ the arms $d^2$, $d^3$, & $d^4$, [as]* combination of the swinging butt-adjuster, and ʌ [— for entering]* adjuster, the board *d'*, pivoted to the swinging butt- ʌ substantially as described.

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By J, Dec. 1, 1882, concluded.

By H, Nov. 6, 1892, concluded.

25th. The combination of the canvas *d*, the board $d[^2,]$* ʌ and chute board, substantially as described.

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JOHN F. STEWARD.

Witnesses:
LAURENCE BEALING.
JOHN H. B. KASPARI.

694 STATE OF ILLINOIS, } ss:
*County of Cook,* }

John F. Steward, the above-named petitioner, a citizen of the United States and resident of Chicago, in the county of Cook and State of Illinois, being duly sworn, deposes and says that he verily believes himself to be the original, first, and only inventor of the improvement in grain-binders described and claimed in the fore-

[* Words and figures enclosed in brackets erased in copy.]
[Matter enclosed between rules erased in copy.]

going specification; that the same has not been patented to him or to others with his knowledge or consent; that the same has not to his knowledge been in public use or on sale in the United States for more than two years prior to this application, and he does not know and does not believe that the same was ever before known or used prior to his invention thereof.

JOHN F. STEWARD.

Sworn to and subscribed before me this 5th day of Oct, 1882.

WILLIAM D. PORTER,
[L. S.] *Notary Public.*

[Endorsed:] 73778. Specification. U. S. Patent Office, Oct. 9, 1882. Class 56.

695 Room No. 41.

C. DEPARTMENT OF THE INTERIOR,
UNITED STATES PATENT OFFICE.
WASHINGTON, D. C., *Oct.* 30, '82.

#73778. Grain-binder. Oct. 9, '82.

J. F. Steward, 410 Seminary Ave., Chicago, Illinois:

Figure 7 is not properly described. The construction shown in this figure should be fully described and the parts lettered.

Attention is called to informal notes and suggestions enclosed.

Claims 8, 11, 16, 17, and 22 are allowable without alteration.

Claims 1, 2, 5, 6, 9, 12 to 14, 18 to 21, 23, and 24 will be allowed, if amended, as suggested.

Claims 3 and 4 are substantially the same in substance. They are rejected upon Chapman, 192,150, 19th June, 1877, and Esterley, 262,026, Aug. 1, '82.

Claim 7 is the same in substance as the 6th, and it should be erased. In claims 5, 6, and 10 it is thought "delivery apparatus" should read "discharge apparatus" for reasons explained in the notes.

696 Claims 10 and 19 are incorrect. The notes explain the objection fully and suggest a remedy.

Claim 15 is the same in substance as the 14 when the latter is properly construed.

Claim 25 is incorrect. If by "board $d^2$" is meant the board $d'$ the claim is the same as the 23d when properly construed; but if the board $e$ is meant the claim is met by the references for claim 3.

E. D. BOYD, *Ex.*

(Enclosure.)

GOLDSBOROUGH, *3rd Assist.*

[Endorsed:] No. 1. 73778. Office letter. Class 56.

697

410 SEMINARY AVE.,
CHICAGO, ILL., *Nov.* 2*nd*, 1882.

Commissioner of Patents.

SIR: In the matter of my application for a patent for improvement in grain-binders, filed Oct. 9th, 1882, I hereby amend in accordance with the requirements and suggestions of the office with few exceptions, which will be pointed out.

A. In line seventeen strike out "and 7" and insert "and" between "5" and "6."

Follow line seventeen, as amended, with "Fig. 7 shows a modification."

Lines 22 and 24, page 1, erase "bundle" and insert "gavel."

Same page, line 29, erase "straw forming the swath" and insert "incoming grain or gavel or bundle."

In line 32 make "swath" read "grain."

Page 5, line 29, strike out "but reversely so" and insert "so that it moves in a reverse direction." [direction."]*

Line 30, same page, strike out "spanning" and insert "operating one on the heads and the other on the butts."

Line 19, page 6, strike out "spanning" and insert "opposing its head and butt."

Page 7, line 33, strike out "In this device I have three distinct" and insert "certain parts of my."

After "invention," line 1, page 8, insert "are," and after "well," line 2, insert "as conjointly."

After "shucking," line 12, same page, insert—

B. "forward by the jarring of the machines, which shucking
698 out of position is often very great in grain that is heavy at the butts."

After "second," line 13, insert "with the same parts removed."

Line 14, same page, strike out "conveying" and insert "directing."

After "short," in line 17, insert—

C. "and especially when short, as without this board there is a clear space between the heads of the gavel and the rear limit of the chute where scatterings may pass freely to the ground."

Page 9, line 4, strike out "find" and insert "reach."

Line 13, after "mechanism" insert "and hence bound too near the butt."

Line 14, same page, make "butting" read "butt-adjusting."

Add to line 18 "and the next bundle will be bound further from the butt."

Line 20, make "butting" read "butt-adjusting."

After "jump," line 25, same page, insert "or swing with a quick movement."

Line 8, page [9]* 10, make "straw that" read "grain which."

Line 10, strike out "by slow growths, as it were," and insert "in length gradually."

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[* Word and figure enclosed in brackets erased in copy.]

Line 3, page 11, strike out "spanning" and insert "operated at each end."

Line 8, strike out "swath" and insert "incoming grain."

The examiner is correct as to the proper use of the words gavel and bundle. They were not purposely used interchang-ably; but regarding swath, I think, he is wrong. He has, no doubt, "followed the cradle" with the "sun in the nineties" and knows just
699 what swath there means. If he has been with harvesters he has seen the grain fall as evenly upon the apron as the best cradler ever laid straw on the ground, and it is in no sense more a swath in one case than the other. He suggests "incoming grain." That might mean in-brought gavel, as if a rake were used.

C—contin'd. Line 15, page 4, strike out "shucking" and insert "working or jarring."

"Shucking," line 12, page 8, would not do to read "shelling."

As amended, I believe the matter clear and trust it will be so considered.

The objection to the terms primary secondary receptacle, I hope, will be removed. I am aware that they are not used in the art, but think it time that some distinction were made between machines that have but one receptacle into which the grain is delivered and there bound, as in the pat. to McPhetrigge, No. 16097, Nov. 18th, 1856, for instance, or in machines where it is carried at one leap, as it were, into the position for binding, as in Palmer, 37408, and those machines where the loose grain is delivered for accumulation and periodically carried into a secondary position for binding.

Spaulding, May 31st, 1870, has a primary receptacle, but no secondary one. He takes his gavel from his prima- receptacle and binds it on the run.

700 Appleby, No. 212,420, and others, before and after, provide two positions—the accumulating and the binding receptacle. I will change the terms if insisted upon, yet I prefer to let them remain in some places.

C—concluded. Line 30, page 8, erase "into *into* the secondary receptacle" and insert "forward to the binding mechanism."

In the notes of the ex. I find these words: "It is observed that the board *e* is much longer than the adjuster and the plate *d'* together, and consequently it is not seen what will prevent the spring board *e* from pushing the bundle forward (the butt not being opposed by anything when the curve of the plate acts), &c." I think that the ex. does not appreciate that the spring is only [long]* strong enough to move the board quickly or make it jump, if permitted to do so, by a short bundle, but not strong enough to move a bundle of grain endwise. The time of the bundle in passing the curve in the board *e* is so short that a strong spring could not overcome the

[* Word enclosed in brackets erased in copy.]

inertia of the bundle and effect an endwise movement. The butt of the gavel accumulates against the plate $d'$, and if the said plate were longer the whole object would be defeated (unless some change were made), because, the said plate $d'$ bearing on the butt of the bundle, the plate $e$ would not be free to jump to meet the head of a short bundle, the two, $d'$ and $e$, being connected.

701 Follow line 1 of page 10 with:

"For the sake of clearness, I will further say the butt-adjusting mechanism in all cases directs the grain to the binding devices (except litterings that are thrown backward).

The position to which the butt-adjuster is swung determines the relative position of the gavel to the binding mechanism. The passage of a bundle so long or far backward that its head will forcibly move the swinging plate when the latter is unlocked will cause the butt-adjusting mechanism to move forward and deposit the succeeding grain in a position further forward in relation to the binding devices. If grain of decreasing length passes, the spring $e'$ will cause the plate $e$ to jump when unlocked until it meets the heads of the same and the butt-adjusting mechanism thus be moved to deposit the grain of each succeeding shorter gavel a little further back in relation to the binding mechanism."

D.

Amend Fig. 7 of drawing by giving the table or deck on which the grain is shown as lying the letter "C." The hinged board vertical thereto adjoining the heads of the grain letter as "$e$," and the board adjoining the butt as "D," and the arm reaching from the former board as "$e^2$," and that from the latter board as "$d^5$." Insert before the claim as follows:

Ex'r: Please amend the drawing.*
Ext. did it.*

702

"In the modification shown in Fig. 7 C is the deck and D the butt-adjuster; $e$ is the swing-board located so as to be influenced by the heads of the grain; $e^2$ and $d^5$ are stiff arms reaching from their respective boards and meeting in a joint, being so connected if one moves the other must do so, but in a reverse direction. Now, if the spring $e'$ or any spring is attached as shown in Fig. 3 the boards will be drawn together with a slight stress, and any body of grain passing through will spread them apart at their lower extremities. It is plain that whatever the length of grain passes its centre will always be at the same place."

E.

[*In pencil in copy.]

Erase. See J, Dec. 1, '82. In this modification it will be preferable to provide D and *e* with revolving canvases like those shown in Fig. 2."

I do not wish to strike out the words "moving grain" and insert "bundle," because I do not wish to limit myself to anything but the grain (that is A) being acted upon, whatever its condition, whether flowing or in the form of a gavel or bundle, as long as by its influence the desired result is produced.

Erase claim 1st and insert:

F. Erase & insert M, Dec. 1, 1882. F, by M, Dec. 1, '82, concluded.

1st. "In a grain-binder, A means substantially such as described for setting the butt-adjuster for operation on the following (such means being adapted to be*) 703 grain, A combined with and operated by the heads of the grain [acted upon]† as set forth."

Claim 2, line 1, make "butting" read "adjusting."

In third line strike out "regulating the adjustment of" and insert "automatically setting the adjuster for directing."

Claim 3rd, insert after "canvas," line 2, "for advancing the butts of the grain," and after "board *e*" add "for retarding the heads of the same."

After line 23, [insert]† page 8, insert:

G. "The use of the canvas *d* and the board *e* produces a new and beneficial result in their joint action upon the grain. In grain that stands thin on the ground and hence is of that condition which always passes up the elevators head first the butts are advanced by the revolving canvas and the heads are retarded by the contact with the board *e*, and thus reach the binding receptacle in much better condition than when the old devices or none are used."

H. In claim 4 insert after "*d*" the words "for advancing the butts of the grain" and after "*e*," next line, insert "for retarding the heads of the same."

In 5th claim strike out "self-binding" in line 2 and make "self-adjusting" read "self-setting."

Claim 6, make "adjusting," second line, read "setting."

It will be seen that there is one more element in claim 7 704 than in the last and hence is not like it. The deck is not essential to the operation of the elements of claim 6, as any moving canvas or rake may be used to convey the grain upward to

[* In pencil in copy.]
[† Words enclosed in brackets erased in copy.]
[Matter enclosed between rules erased in copy.]

the binding mechanism, as in machines that have been made. 6 is a broad claim, while 7 is limited.

H—contin'd. In claim 9, line 1, strike out "swath of grain" and insert "grain acted upon."

Line 2, strike out "adjusting" and insert "setting" and make "butting" read "butt-adjusting."

Claim 10 I do not think open to the objection pointed out, which the examiner will see if he bears in mind that the locking device can be removed. The elements, as well as the combination of them in the claim, will then be apparent. Amend it as follows, and it will be clear: In 1st line strike out "delivery" and insert "harvester delivering" and make "butting," next line, read "butt-adjusting."

Claim 12, make "butting" read "butt-adjusting."

In claim 13 make "adjusting" read "setting."

butting

Claim 14, make ["butt-adjusting"]* read "butt-adjusting."

After "the," third line, insert "board *e* and" and make "swath or bundle of" read "passing."

After "power," 4th line, insert "for" and follow "adjustment" with "of the butt-adjuster."

In claim 15 make "butting" read "butt-adjusting." I am
705 not willing to admit that claims 14 and 15 are alike for the reasons given in treating of claims 6 and 7, which see.

H—concluded. In claim 18, line 2, make "butting" read "butt-adjusting."

Erase "locking," 3d line, and after "mechanism" insert "for locking the board *e*."

In claim 19 make "butting" read "butt-adjusting." I desire to retain this claim, as I believe it a legitimate one. The remarks regarding it may have been intended for other matter. If the examiner rejects it, giving his reasons, I will then be prepared to argue the point.

In claim 20 make "adjusting" read "setting" and "butting," next line, read "butt-adjusting."

Claim 21, make "butting" read "butt-adjusting."

Claim 23d, second line, strike out ["moving but- -adjusting"]* "butting" and insert "moving butt-adjusting."

After "the," first line of claim 24, insert "combination of the swinging butt-adjuster" and make "as" read "and."

Claim 25, make "$d^2$" read "$d$."

It is suggested by the examiner that claims 23 and 25 are alike. I do not so think and will refer to my argument regarding claims 6 and 7.

All of which is respectfully submitted, with thanks for the suggestions.

JOHN F. STEWARD.

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[* Words enclosed in brackets erased in copy.]

[Endorsed:] No. 2. 73778. Amendment- A, B, C, D, E, F, G, H. John F. Steward, Nov. 6, 1882. (U. S. Patent Office, Nov. 6, 1882.) Class 56.

706 Room No. 41.

Comp'd.*

C.* DEPARTMENT OF THE INTERIOR,
UNITED STATES PATENT OFFICE,
WASHINGTON, D. C., *Nov.* 20, '82.

#73778. Grain-binders. Oct. 9, '82.

J. F. Steward, 410 Seminary Ave., Chicago, Illinois:

The modification in figure 7 should have a spring such as appears in the other construction, for without it the device cannot operate as described.

In line 28, page 8, the word table should be substituted for the phrase "primary receptacle in the form of a swath," for the retention of the latter would lead to confusion. There is new matter in lines 18 to 21, inclusive, page 6 of the amend't, not warranted by the app'n as originally filed, and their erasure is necessary.

Attention is called to the enclosed informal notes. They include suggestions for the amend't of claims 1, 5, 6, 10, 14, and 19 which will make them allowable.

707 Claims 2, 3, 8, 11 to 13, 16 to 18, and 20 to 24 are allowable at present. Claim 4 is the same in substance as claim 3. Claim 7 is the same in substance as claim 6. Claim 15 is the same in substance as claim 14, and claim 25 is the same as claim 23, applicant's remarks to the contrary notwithstanding. A new claim is suggested for the 9th claim.

GOLDSBOROUGH, *3rd Assist.*

PERRY B. PIERCE,
*First Ass't Ex'r, in Ch'ge.*

(Enclosure.)

[Endorsed:] No. 3. 73778. Office letter. Nov. 20, 1882. Class 56.

708 Room No. 41.

Comp'd.*

C. DEPARTMENT OF THE INTERIOR,
UNITED STATES PATENT OFFICE,
WASHINGTON, D. C., *Nov.* 28, '82.

Grain-binders. Oct. 9, '82. 73778.

J. F. Steward, 410 Seminary Ave., Chicago, Illinois:

Claims 23 and 25 are met by Eng. pat. 4092 of 1881, recently made available as a reference.

E. D. BOYD, *Ex.*

GOLDSBOROUGH, *3rd Ass't.*

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[* In pencil in copy.]

[Endorsed:] No. 4. 73778. Office letter. J. F. Steward, Nov 28, 1882. Class 56.

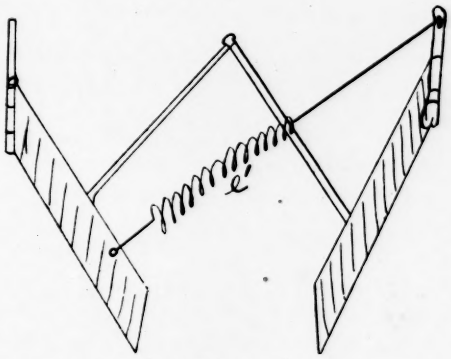
709 #3511.*

410 SEMINARY AVE., CHICAGO, ILL., *Nov.* 26, 1882.

Commissioner of Patents.

SIR: In the matter of my application for a patent for improvement in grain-binders, filed Oct. 9th, 1882, amend as follows:

In Fig. 7 of drawings show as spring for acting upon the board *e* thus




and letter it *e'*.

I. Lines 27 and 28 of page 8, strike out "primary receptacle in the form of a swath" and insert "table" in its place.

of amend't filed Nov. 6, '82,

Strike out from "In," line 18, page 6, A to the close of line 21, same page.

J. Strike out claims 4, 7, 14, and 25.

Substitute for claim 9 as follows:

K. 7. "In a grain-binder, mechanism for adjusting the butts of the grain, said mechanism adapted to be adjusted by the action of the grain."

L. In line 12 of specification, page 8, make "suc*h*ing" read "chuc*h*ing or working."

Amend claim 1 to read as follows:

M. 1. In a grain-binder, the combination of the butt-adjuster with means, substantially such as described, for setting the butt-adjuster for operation on the flowing grain, said means being adapted to be operated by the grain, [rested upon]† as and for the purpose described."

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[* In pencil in copy.]
[† Words enclosed in brackets erased in copy.]

710 & 711 So amended it will conform to the requirements as I understand them.

In claim 5, after "plate *e*," insert:

N. "on the binder table adapted to be operated by the grain," and make "conveying" read "directing," and insert "succeeding" before "gavel."

Insert "harvester" before "delivery" in claims 6.

I feel confident that claim 10 [and 19 are]* is A not understood. I speak of removing the locking device *f*, and if the examiner will consider it removed for the time being he will see the full force of claims 10 [and 19]* and, I think, allow it; if not, I will amend it.

Regarding claim 17, the butt-adjusting mechanism is free to yield under the pressure of the passing swath whenever the locking device mechanism is not in action. A binder provided with the A set forth and claimed in 19 will operate in tangled grain where an unyielding butt-adjuster will not, but will clog. My adjuster will yield out of the way and let the mass pass when the locks — not acting.

I will amend claims 10 and 19 to make them clearer if still considered necessary.

Insert "bundle" before discharging in place, claim 11.

Very resp'y, J. F. STEWARD.

[Endorsed:] No. 5. 73778. Amendment- I, J, K, L, M, N. J. F. Steward, Dec. 1, 1882. U. S. Patent Office, Dec. 1, 1882. Class 56.

712 410 Seminary Ave.,
Chicago, Ill., *Dec. 4th*, 1882.

Commissioner of Patents.

Sir: In the matter of my application for a patent for improvement in grain-binders, filed Oct. 9th, 1882, No. 73778, I wish to say that the invention by me is older than the English pat. referred — in the last official letter—that of Nov. 28th, 1882—as will appear below, and I trust that fact will remove the objection in accordance with rule 74.

Very resp'y, JOHN F. STEWARD.

County of Cook, }
*State of Illinois*, } ss:

John F. Steward, being duly sworn, deposes and says that he is the inventor of certain improvements in grain-binders, set forth in the application N-. 73778, filed Oct. 9th, 1882, and that the invention was perfected before Jan. 1st, 1881, and that a working model was completed by him on the 10th day of March, 1881, which model is now in his possession and bears the date of completion as above.

JOHN F. STEWARD.

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[* Words and figures enclosed in brackets erased in copy.]

Sworn to and subscribed before me this 4th day of December, 1882.

WILLIAM D. PORTER,
[L. S.] *Notary Public.*

[Endorsed:] No. 6. 73778. Letter to office and affidavit. J. F. Steward, Dec. 7, 1882. (U. S. Patent Office, Dec. 7, 1882.) Class 56.

713 Room 41.

C. C.* DEPARTMENT OF THE INTERIOR,
UNITED STATES PATENT OFFICE,
WASHINGTON, D. C., *Dec.* 20, '82.

Grain-binders. Octo. 9, '82. 73778.

J. F. Steward, 410 Seminary Ave., Chicago, Illinois:

The claims are now allowable, excepting the 20th, originally the 23rd.

The affidavit filed for the purpose of showing a completion of the invention covered by this claim prior to the date of the English patent cited is not sufficient to overcome the force of the reference. The statement that "the invention was perfected" is not a compliance with rule 74, which requires, not an oath as to the fact of completion, but "an oath as to facts," which facts shall show a completion of the invention, the office to be the judge of the sufficiency of the facts sworn to to show completion. See Comm'r's decision, Casset, 17 O. G., 507. Neither does a statement as to the fact "that a working model was completed" show a completion of the invention, because "that must be shown by direct evidence of the con-
714 struction and use of machines." See Howes *et al. vs.* McNeal, 17 O. G., 799. The affidavit is further insufficient, inasmuch as it fails to state that "applicant has never abandoned the invention."

E. D. BOYD, *Ex.*

GOLDSBOROUGH, *3rd Assist.*

[Endorsed:] No. 7. 73778. Office letter. Dec. 20, 1882. Class 56.

715 STATE OF ILLINOIS, }
*County of Cook,* } *ss:*

Before me, the subscriber, a notary public in and for the county of Cook, personally appeared John F. Steward, who, being duly sworn, deposes and says that the invention described and claimed in his application for letters patent of the United States, filed Oct. 9th, 1882, and numbered *93778*, was made prior to the date of the foreign patent cited in the official letter from the Commissioner of Patents dated Nov. 28th, 1882, namely, "English pat. 4092 of 1881;"

[* In pencil in copy.]

that he constructed a working model before March 10th, 1881, from which the drawings in the application above referred to were made, and that he has made working machines strictly in accordance with the drawings and operated them in the field, and that he does not know and does not believe that the invention has been in public use or on sale in this country for more than two years prior to his application, and that he has never abandoned the invention.

JOHN F. STEWARD.

Subscribed in my presence and sworn to before me this 23d of December, A. D. 1882.

WILLIAM D. PORTER,
[L. S.] *Notary Public.*

[Endorsed:] No. 8. 73778. Affidavit. John F. Steward, Dec. 28, 1882. (U. S. Patent Office, Dec. 28, 1882.) Class 56.

716

410 SEMINARY AVE.,
CHICAGO, ILL., *Dec. 25th*, 1882.

Commissioner of Patents.

SIR: In the matter of my application for a patent for improvement in grain-binders, filed Oct. 9th, 1882, and numbered 73778, I wish to say that I enclose an affidavit as required by rule 74, which I trust will this time conform to the requirements of the office.

Respectfully, JOHN F. STEWARD.

[Endorsed:] No. 8. 73778. Letter to office. J. F. Steward, Dec. 28, 1882. (U. S. Patent Office, Dec. 28, 1882.) Class 56.

716½ (2-024.)

Serial No., 73778.

Issue division.

All communications should be addressed to "The Commissioner of Patents, Washington, D. C."

DEPARTMENT OF THE INTERIOR,
U. S. PATENT OFFICE,
WASHINGTON, D. C., *Jan.* 22, 1883.

John F. Steward, 410 Seminary Ave., Chicago, Ill.

SIR: Your application for a patent for an improvement in grain-binders, filed Oct. 9, 1882, has been examined and allowed.

The final fee, twenty dollars, must be paid, and the letters patent bear date as of a day not later than six months from the time of this present notice of allowance.

If the final fee is not paid within that period the patent will be withheld, and your only relief will be by a renewal of the application, with additional fees, under the provisions of section 4897, Revised Statutes. The office aims to deliver patents upon the day of their date, and on which their term begins to run; but to do this

properly applicants will be expected to pay their final fees at least twenty days prior to the conclusion of the six months allowed them by law. The printing, photolithographing, and engrossing of the several patent parts, preparatory to final signing and sealing, will consume the intervening time, and such work will not be done until after payment of the necessary fees.

When you send the final fee you will also send, distinctly and plainly written, the name of the inventor and title of invention as above given, date of allowance, (which is the date of this circular,) date of filing, and, if assigned, the names of the assignees.

If you desire to have the patent issue to assignees, an assignment containing a request to that effect, together with the fee for recording the same, must be filed in this office on or before the date of payment of final fee.

Additional copies of specifications and drawings will be charged for at the following rates: Single copies, uncertified, 25 cents; twenty copies or more, 10 cents each. The money should accompany the order.

Very respectfully,

E. M. MARBLE,
*Commissioner of Patents.*

[Printed on the margin in red ink:] The within title is that given by the examiner in charge, as most appropriate to your invention. Should you desire a change in the same, satisfactory reasons must be given therefor on or before the payment of the final fee.

[Printed across the face in red ink:] ☞In remitting the final fee give the serial number at the head of this notice.

717 $20 M. B.

CHICAGO, ILL., *Jan. 27th*, 1883.

Commissioner of Patents.

SIR: I enclose $20.00, which apply as final fee in my application filed Oct. 9th, 1882, for improvement in grain-binders, & oblige

J. F. STEWARD.

[Endorsed:] Received Jan. 30, 1883.

718 Serial No., 73778. Ex'r Book No. 73–17.

1882.

Patent No. 272,598.

John F. Steward,
Of Chicago,
County of Cook,
State of Illinois.
Invention: Grain-binders.

52—322

Parts of application filed.
- Petition, Oct. 9, 1882.
- Affidavit, " "
- Specification, " "
- Drawing, 2 sheets, " "
- Model, none.
- Specimen, ——.
- 1. First fee, cash, $15, Oct. 9, 1882.
- " " cert., ——.

App. filed complete Oct. 9, 1882.
Examined Jan'y 20, '83. E. D. Boyd, ex.
2. Countersigned: J. W. Babson,
Jan. 22, '83. For Commissioner.
Notice of allowance, Jan. 22, 1883.
Final fee, cash, $20, Jan. 30, 1883.
" " cert., —— —, 188–.
3. Patented Feb. 20, 1883.
Att'y or P. O. address, 410 Seminary Ave., Chicago, Ill.

719 1882.

*Contents.*

Application papers:
1. Rejection, Oct. 30, '82.
2. Amendment, Nov. 6, 1882.
3. Rejection, Nov. 20, '82.
4. Rejection, Nov. 28, '82.
5. Amendment, Dec. 1, 1882.
6. Letter to office & affidavit, Dec. 7, 1882.
7. Rejection, Dec. 20, '82.
8. Letter & affidavit, Dec. 28, 1882.
9. Passed Jan. 20, '83.
10.
11.
12.
13.
14.
15.
16.
17.
18.
19.
20.

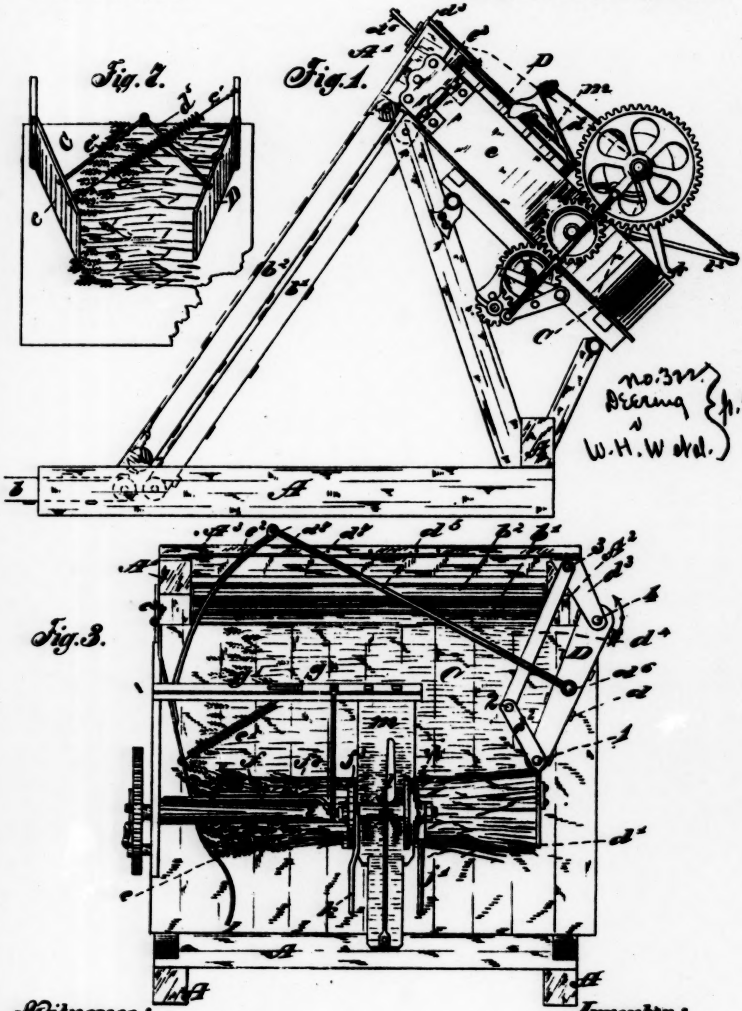
Title: Improvement in grain binders.
Ex'd: J. A. W.; S. P. P.

(No Model.) 2 Sheets—Sheet 1.

# J. F. STEWARD.

## GRAIN BINDER.

No. 272,598. Patented Feb. 20, 1883.




no. 322 Deering v W. H. W et al. } p. 722

Witnesses:
James Gilchrist
John B. Kaspari

Inventor:
John F. Steward

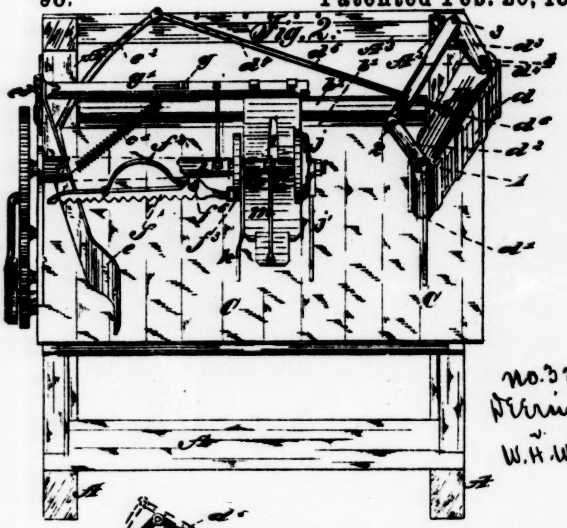
(No Model.) 2 Sheets—Sheet 2.

# J. F. STEWARD.

## GRAIN BINDER.

98. Patented Feb. 20, 1883.

Fig. 2.



No. 322. Deering W. H. W. Ehd. } h. 723

Fig. 4.

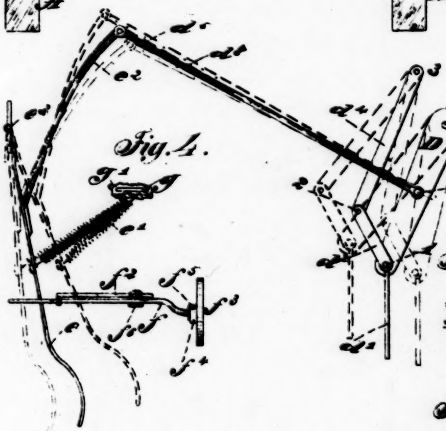


Fig. 5.

Fig. 6.

Witnesses:
James G. Chester
John B. Kaspar

Inventor:
John F. Steward

720 UNITED STATES PATENT OFFICE.

JOHN F. STEWARD, of Chicago, Illinois.

## *Grain-binder.*

Specification forming part of Letters Patent No. 272,598, dated February 20, 1883. Application filed October 9, 1882. (No model.)

To all whom it may concern:

Be it known that I, John F. Steward, of the city of Chicago, county of Cook, and State of Illinois, have invented certain new and useful improvements in grain-binders, of which the following is a full specification, reference being had to the accompanying drawings, in which—

(Here follow diagrams marked pp. 722 & 723.)

Figure 1 is a rear end view of the frame-work of the harvester, showing the binder in its proper relation thereto. Fig. 2 is an outer or stubble side view of the same. Fig. 3 shows the parts as viewed from a point above and in a line at right angles to the decking of the binder. Fig. 4 shows the various positions assumed by the parts that constitute my invention. Figs. 5 and 6 are details. Fig. 7 shows a modification.

The object of my invention is to provide means that, combined with an automatic grain-binder, shall make it automatically regulate the position of the band on the gavel—that is, shall automatically place the band upon the gavel in its proper position relative to the length of the grain without any aid or attention from the operator; and its nature consists in locating, in such a position as to be influenced by the heads of the incoming grain, or gavel or bundle, a device to be moved thereby, the said device connected with means for adjusting the relative positions of the said grain and the binding mechanism. Under the principle involved many methods may be resorted to to attain the result. I have selected and developed what appears to me to be the most feasible plan. Several subordinate ends are reached by the different elements of the device, which will be pointed out.

My invention is capable of being applied to any form of binder, but I here show it applied to one now much used. I will describe the binder only so far as is necessary to a correct understanding of my improvement.

In the drawings, A is the frame-work of the harvester, upon which the binder is mounted; *b*, the platform-canvas; *b'* and *b²*, the elevating-canvases.

C is the chute-board or decking, onto which the grain is deposited in a loose state by the elevators, and it is slotted to permit the packers and needle to work through it.

D is the grain-adjusting mechanism, consisting of a frame carry-

ing a roller at each end, around which rollers is drawn the endless canvas *d*. The larger or upper roller is driven from the gearing of the harvester in the usual manner, and moves in the direction indicated by the arrow in Fig. 3. The adjuster-frame vibrates on the axis of this upper and driving roller. So far the adjusting and butting mechanism does not differ from many in use, and constitutes no part of the present invention, only as combined with other elements.

$d^3$ is an arm secured to the top of the post $A^2$, overreaching the decking parallel therewith, and to this arm above and to the deck below is pivoted the swinging frame D.

$d'$ is a thin board or plate of metal, as wide as the adjusting-canvas, and pivoted to the frame of the latter at its lower extremity. From this board reaches upward and inward (see Fig. 3) an arm, $d^2$. The board and arm are as one piece; but the board itself is made in two parts, so that its greater portion (which is the lower) can be removed.

Near the end of the arm $d^2$ is pivoted the bar $d^4$, connecting the arm $d^2$ with the overreaching arm $d^3$ near its top. In this arrangement we have four pivots, numbered 1, 2, 3, and 4. The distance between 1 and 2 is equal, or nearly so, to that between 3 and 4, and the distance between 1 and 4 to that between 2 and 3. In effect, then, the parts D, $d^2$, $d^3$, and $d^4$ describe a quadrilateral having substantially equal and parallel sides, so that to whatever point the frame D is swung in its adjustment the arm $d^2$ will remain parallel with the fixed arm $d^3$, and the board $d'$ will always remain parallel with the edge of the decking, close to and over which the whole vibrates.

$d^5$ is a connecting-rod pivoted at $d^6$ to the frame D, the adjustment of which it controls, and reaches upward and backward over the decking, passing near the top rail $A^3$ of the harvester-frame. It is provided with the holes $d^7$ at a point where it passes the top rail, in which latter holes are also provided, so that by means of a pin passing through one and entering the other the whole device can be secured in any position; but it must be remembered that this means for securing the parts in place is but for use in special cases, which will be hereinafter pointed out.

720½ The board $d'$ is of such length as to reach as low as the accumulating gavel and prevent the grain forming it while accumulating from working or jarring forward. The butting or adjusting mechanism is given an amount of variation in its adjustment from a line parallel with and over the front edge of the chute-board to a point so far backward as to carry short grain sufficiently far back to be bound centrally. Three positions are shown in Fig. 4.

*e* is a board or plate of metal, nearly equal in width to that of the adjusting-canvas *d*. It is pivoted to the post A' of the harvester by any suitable means. I show it hinged to a plate, $e^3$, bolted to the said post. It lies in a position to the deck or chute-board corresponding with that of the adjusting-canvas. This board or plate is nearly straight from the pivotal point downward to nearly its lower

extremity, where it curves forward toward the bundling devices and then backward. The form may be much varied, but I consider the curvature here given best. When the gavel is in the position to be bound it is still just above the curve in the plate, as seen in Fig. 3.

$e'$ is a spring secured at one end to the upper edge of the board $e$, at about the middle of its length, the other end of the said spring being attached to a bolt, $g$, adjustable in a slot in the bar $g'$ of the frame-work of the binder. By this means the plate $e$ is caused to press elastically toward the grain, when not restrained by locking mechanism hereinafter explained, and the elastic pressure is adjustable as circumstances may require.

$e^2$ is an arm secured to the board $e$ at its upper edge and near its top or hinged end, the said arm reaching upward over and parallel with the decking and connecting by a joint with the rod $d^5$. By this means the movement of the board or plate $e$ is transmitted to the adjuster D, so that it moves in a reverse direction. In other words, the two parts, operating one on the heads and the other on the butts of the grain, are so connected that they approach or recede from each other when one is moved. These parts, because of their weight, are inclined to swing apart, and also, because of the tendency of the motive power on the canvas $d$, to swing its frame outward, and hence the spring $e'$ must be strong enough to overcome these tendencies, and as much stronger as is wished to have the parts moved quickly by the said spring when it is at liberty to move them.

With the above-described parts in the positions shown in Fig. 3, and the bundle as there shown, it is plain that if the bundle is quickly ejected it must engage the curved part of $e$ and force it out of its way, and hence backward, and the butting-canvas being connected thereto it will be moved forward. Two forces then are apparent—the bundle to force the parts opposing its head and butt from each other, and the spring to retract them. In order that each bundle shall leave the parts fixed for the time being in any position it may have caused them to assume, I provide a locking device that shall at all times retain the parts, except just while the head of each bundle is passing the curve on the plate $e$, which device is constructed as follows:

From the arm $i$ of the binder-frame (cut away in Fig. 2 to show the latching device) I depend a support, $f^6$. To this is pivoted the lever $f$, which lever is notched upon its lower edge. The position of this lever is such that its notched edge rests upon the upper edge of the plate or board $e$. From its pivotal point this lever reaches forward a short distance to the disk $f^3$, and is provided with an anti-friction roller, $f^5$, which is engaged and moved by the cam $f^4$ on the said disk, the latter being keyed to the knotter-driving shaft, which makes one complete revolution to each operation of the binding mechanism. The lever is thus lifted from off the plate $e$ once in each revolution for an instant. The time of this lifting is made to correspond with the action of the discharge-arms $j'$ and $k$, so that when they have engaged the bundle to eject it the plate $e$ shall be

free to respond to any pressure of the bundle while the latter is passing its curved end.

$f^2$ is a spring acting upon the latch-lever $f$ to return it quickly to its place for engagement with the plate $e$ after being acted upon by the cam $f^4$.

$m$ is the breast-plate between the tying mechanism (not shown) secured to it and the grain being bound. $l$ is a slot for the passage of the needle. $j$ is the knotter-rotating gear, to which is secured the discharge-arm $j'$. To the disk $f^3$ is secured the discharge-arm $k$.

Before describing the operation of the parts conjointly, I wish to state that certain parts of my invention are capable of use singly as well as conjointly, and I will first point out such independent action, believing that their joint action will be more quickly understood. First, if the pivot-bolt connecting $e^2$ and $d^5$ and the locking device be removed, and a pin is inserted into the holes in the top rail and through the holes $d^7$ in the connection $d^5$, I have an adjustable butting mechanism supplemented by the board $d'$ for preventing the gavel from working forward by the jarring of the machine, which shucking out of position is often very great in grain that is heavy at the butts; secondly, with the same parts removed, I have an elastically-swinging board for directing scatterings caused by imperfect adjustment of the reel of the harvester or any other cause into the gavel, whether the grain be long or short, and especially when short, as without this board there is a clear space between the heads of the gavel and the rear limit of the chute, where scattering may pass freely to the ground.

With the parts all connected, as best shown in Figs. 2 and 3, I have, as before stated, a device for regulating the position of
721 the grain relative to the binding mechanism, the operation of which I will now describe.

The use of the canvas $d$ and the board $e$ produces a new and beneficial result in their joint action upon the grain. In grain that stands thin on the ground, and hence is of that condition which always passes up the elevators head first, the butts are advanced by the revolving canvas and the heads are retarded by the contact with the board $e$, and thus reach the binding-receptacle in much better condition than when the old devices, or none, are used. The cut grain falls on the platform-canvas and is conveyed to and elevated by the elevating-canvases and delivered in a loose state onto the table, when it is engaged by the usual pushing mechanism and forced forward to the binding mechanism, where it is bound, and from which it is finally ejected by the discharge-arms or other means. With the butting mechanism, and the board or plate $e$ in their positions nearest approaching each other, we will suppose the grain first acted upon to reach them. If the grain is long, the head of the bundle, when discharged, will press forcibly against $e$, more especially against its curve, and force it backward, it being at the proper instant permitted to move by being unlocked by the action of the cam $f^4$. The first bundle thus bound may be carried too far backward in its approach to the binding mechanism, and hence bound too near the butt; but when it is discharged the butt-adjust-

ing device acts under the influence of the plate *e*, and is hence moved forward to a position more nearly in keeping with the requirements, and the next bundle will be bound farther from the butt. If when going into a field of short grain the butt-adjusting mechanism and plate *e* are wide apart, the first bundle will be deposited too far forward in the receptacle, and hence bound too near the heads; but upon its discharge the board *e* will be permitted to jump or swing with a quick movement to a position as far forward as the position of the bundle at that instant will permit, and hence the butting mechanism will be set for short grain. If the device is set to proper position for the first bundle before going into the grain, it will be properly bound, and it will leave the parts in position for the succeeding one.

For the sake of clearness, I will further say the butt-adjusting mechanism in all cases directs the grain to the binding devices, (except litterings that are thrown backward.) The position to which the butt-adjuster is swung determines the relative position of the gavel to the binding mechanism. The passage of a bundle so long or far backward that its head will forcibly move the swinging plate when the latter is unlocked will cause the butt-adjusting mechanism to move forward and deposit the succeeding grain in a position farther forward in relation to the binding devices. If grain of decreasing length passes, the spring *e'* will cause the plate *e* to jump, when unlocked, until it meets the heads of the same, and the butt-adjusting mechanism thus be moved to deposit the grain of each succeeding shorter gavel a little farther back in relation to the binding mechanism.

It may seem to those theoretically versed in the art, yet unfamiliar with the operation of harvesting machinery in actual work, that the adjustments will not be perfect; but when the fact is taken into account that the change of length of grain which the machine advances to meet is generally gradual, and that the gavels increase and decrease in length gradually, the movement imparted to the regulating device will be competent to do its work, which it does in practice to a remarkable degree.

The modifications that may be made in this arrangement are almost unlimited. For instance, the butting device may be of any kind competent to give the swath direction into the receptacle, or it may be of the kind that moves the gavel bodily endwise. The board or plate *e* may be connected with the butting mechanism in various ways, and the plate *e* itself may be varied, yet should any device be used capable of being influenced by the heads of the grain, whether in swath, gavel, or bundle, for the purposes set forth, I should consider it an equivalent. The spring *e'* may be connected with the butting mechanism direct as to any of the moving parts. The locking arrangement may be varied, and even dispensed with under some circumstances. These suggested modifications are shown in an additional figure—that numbered 7. In this the grain is shown as operated at each end by the two plates or boards, and it is plain that as the distance between these boards at their delivery end is regulated by the length of the grain, the butt-board will

be caused to deliver the incoming grain properly. This would be used in that class of binders where the grain accumulates in the receptacle in a free state, and is taken bodily therefrom by the needle. The plate *e* may be located upon the elevator and connected with the adjusting or butting mechanism and produce the same effect.

In the modification shown in Fig. 7, C is the deck, and D the butt-adjuster. *e* is the swing-board, located so as to be influenced by the heads of the grain. $d^2$ and $d^5$ are stiff arms, reaching from their respective boards and meeting in a joint, being so connected if one moves the other must do so, but in a reverse direction. Now, if the spring *e'*, or any spring, is attached as shown in Fig. 3, the boards will be drawn together with a slight stress, and any body of grain passing through will spread them apart at their lower extremities. It is plain that whatever the length of grain passes, its center will always be at the same place.

What I claim is—

1. In a grain-binder, the combination of the butt-adjuster with means, substantially such as described, for setting the butt-
721½ adjuster for operation on the flowing grain, said means being adapted to be operated by the grain, as and for the purpose described.

2. The combination of the adjusting mechanism of a grain-binder with means, substantially such as described, for automatically setting the adjuster for directing the grain into the binding mechanism, as set forth.

3. The combination of the swinging revolving canvas for advancing the butts of the grain with the board *e* for retarding the heads of the same.

4. The combination, with the delivery apparatus of a harvester, of a self-setting plate, *e*, on the binder-table, adapted to be operated by the grain for directing scattering grain into the succeeding gavel, substantially as described.

5. The combination, with the harvester delivery apparatus, of the self-setting plate *e* and the spring *e'*, adjustable in its tension, substantially as described.

6. The combination of the board *e*, spring *e'*, bolt *g*, and slotted bar *g'*, substantially as described.

7. In a grain-binder, mechanism for adjusting the butts of the grain, said mechanism adapted to be adjusted by the action of the grain.

8. The combination, with the harvester delivering apparatus and the elastically-yielding butt-adjusting mechanism, of means, substantially such as described, for varying the stress of elasticity, as set forth.

9. In combination with the bundle-discharging mechanism of a grain-binder, the board *e*, for the purposes set forth.

10. The combination of the discharge-arms, the board *e*, and the butt-adjusting mechanism, substantially as described.

11. The combination of the self-setting board *e*, and locking mechanism, substantially as set forth.

12. The plate or board $e$ and connecting mechanism as means for transmitting the power exerted by the spring $e'$ and swath or bundle of grain to the butt-adjusting mechanism, substantially as described.

13. The combination of the spring-latch with the board $e$, substantially as described.

14. The combination, with the board $e$, of the butt-adjusting mechanism and the board-locking mechanism, substantially as described.

15. The combination of the board $e$ and butt-adjusting mechanism with intermittently-operating mechanism for locking the board $e$, substantially as described.

16. The elastically-yielding butt-adjusting mechanism, in combination with locking mechanism, substantially as described.

17. The combination, with the self-setting butt-adjusting mechanism, of the latch $f$ and cam $f^4$, substantially as described.

18. The combination of the board $e$, arm $e^2$, connecting-rod, $d^5$, butt-adjusting mechanism, and board $d'$, substantially as described.

19. The combination of the board $e$ and board $d'$, substantially as described.

20. The combination, in a grain-binder, of moving butt-adjusting mechanism and the board $d'$, substantially as described.

21. The combination of the swinging butt-adjuster, the arms $d^2$, $d^3$, and $d^4$, and the board $d'$, pivoted to the swinging butt-adjuster, substantially as described.

JOHN F. STEWARD.

Witnesses:
LAURENCE BEALING.
JOHN H. B. KASPARI.

727 UNITED STATES PATENT OFFICE.

EDWIN CHAPMAN, of Rochester, Minnesota, assignor to Chapman Binder Company, of same place.

*Improvement in Grain-binders.*

Specification forming part of Letters Patent No. 192,151, dated June 19, 1877; application filed January 2, 1877.

To all whom it may concern:

Be it known that I, Edwin Chapman, of Rochester, in the State of Minnesota, have invented an improvement in grain-binders, of which the following is a specification.

This improvement is to be used upon any harvester in which the cut grain is elevated and then delivered upon a platform for binding automatically.

In my machine there is a receiver for the grain, at the bottom of which is a hinged platform-section, that is raised at the proper time to deliver the grain upon the binding-platform. This feature, however, is not my invention. The wire, after it has been put around the bundle, is twisted together by a revolving T-shaped twister similar to that shown in my patent No. 184,505.

The improvements in this application relate to elevating-ribs upon the platform, that raise the grain sufficiently to allow the point of the wire-carrying arm to pass in between the grain and platform, thereby lessening the risk of the straw becoming entangled in the point of the wire-carrier, which often happens in machines where the point of the wire-carrier passes through a slot in the platform.

I also make use of gathering-arms, swinging with the wire-carrier, and compressors and pushers operated beneath the platform, and extending up through slots in said platform, to aid in consolidating the bundle, and in delivering the same when bound. I also improve my aforesaid twister by operating the cutters by a peculiar toggle, and the links to the cutters are adjustable to compensate wear upon the knives or in the joints. The wire-carrying arm has a bow-guard, that keeps the grain from falling until the wire-carrier is raised.

In the drawing—

(Here follow diagrams marked pp. 725 & 726.)

Figure 1 is a plan of the binding mechanism. Fig 2 is a vertical section of the same, and Fig. 3 is a plan of the twisting devices.

The frame of the machine is of a size and shape adapted to receive the parts and to be connected to the harvester. I have shown the uprights *a*, longitudinal beams *b*, and cross-beams *c*, and this frame is sustained upon suitable rollers or wheels, as usual.

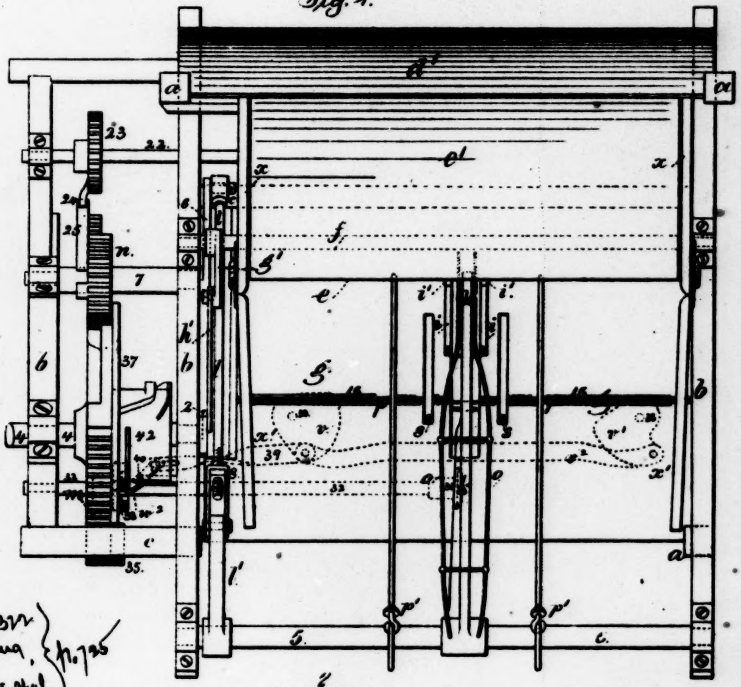
2 Sheets—Sheet 1.

# E. CHAPMAN.

## GRAIN-BINDER.

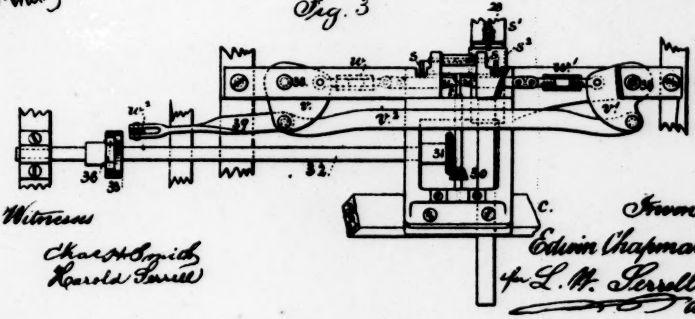
No. 192,151. Patented June 19, 1877.

Fig. 1.



No. 322 Deering v. W.H.W. Wal. } p. 735

Fig. 3



Witnesses

Chas. H. Smith
Harold Serrell

Inventor
Edwin Chapman
for L. W. Serrell
Atty.

2 Sheets—Sheet 2.

E. CHAPMAN.

GRAIN-BINDER.

No. 192,151. Patented June 19, 1877.

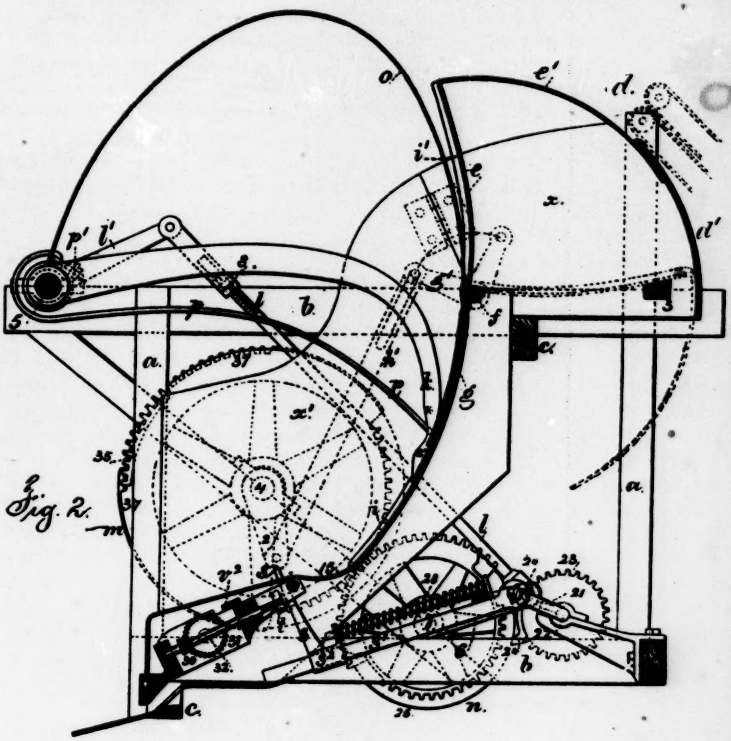


Fig. 2.

No. 322.
Deering
v.
W. H. W. et al.
p. 726.

Witnesses:

Chas. H. Smith
Harold Serrell

Inventor

Edwin Chapman

for Lemuel W. Serrell
Atty.

The grain is brought up by an endless apron to the grain-receiver. The rollers and aprons at *d* represent the location of the elevator.

At the back of the grain-receptacle is a curved stationary shield, *d'*, and the hinged section of the platform is made of the curved face *e* and cylindrical segment *e'* at the back, adjacent to the stationary shield. This section of the platform is attached to the cross-shaft *f*, that forms a hinge for the same, and also serves for moving the said section up into the position shown by full lines in Fig. 2, or down into the position shown by dotted lines.

The platform *g* is inclined and curved. The operation of this receiver and hinged section of the platform will be set forth hereinafter. I remark that the same is not original with me. I, however, have arranged a mechanism for operating the same, which consists of the crank *g'*, slotted link *h'*, and crank 2 upon the main driving-shaft 4. The lengths of the crank 2 and *g'*, and of the slot in the link *h'*, are such that the hinged platform-section will be swung up suddenly, and then immediately lowered after the crank 2 has passed the center, and then the platform-section will remain at rest in a nearly horizontal position, upon supports 3, while the main shaft 4 moves the remainder of its revolution, the slot in the link *h'* allowing of the same.

When the hinged section of the platform is swung up vertically the wire-carrier *k* upon the shaft 5 is operated and passes across the surface of *e*, and then down the surface of the platform *g*, carrying down the loose grain that has been discharged from the receiver upon the platform *g* by the swinging up of the hinged section, and immediately thereafter the hinged section drops back by the movement of the crank and link, and forms a receiver, into which the grain falls from the elevator while the binding operation is being performed.

If the platform *g* was slotted, as has heretofore been done, the end of the wire-carrier in passing through the same would be likely to carry some of the straws with it and become obstructed.

I prevent this difficulty and dispense with the slot by the
728 elevating-ribs *i* upon the platform *g*, between which the point of the wire-carrier passes, and these ribs raise the grain sufficiently from the platform for the point of the carrier to pass beneath the straw.

Upon the surface of the section *e* there are ribs *i'*, that form continuations of the ribs *i* for the same purpose.

The wire-carrier *k* and shaft 5 are operated by the crank 6 upon the second shaft 7, and a pitman, *l*, that extends to the arm *l'* on the shaft 5. There is a turn-buckle or screw-adjuster, 8, in the pitman *l*, to regulate its length accurately, so that the point of the wire-carrier reaches the twisting mechanism upon its downward movement, and the second shaft 7 receives its motion at the proper time by the stop-motion gears *m* and *n*, that are provided with teeth and with cylindrical segments substantially similar to those in letters patent No. 123,237, so that the second shaft 7 will be turned at the proper time to bring down the wire-carrier, and pause while

the wire is being twisted, and then the further movement of the shaft 7 elevates the wire-carrier, and it again pauses while the platform-section is being tilted.

Upon the back of the wire-carrier there is a bow-guard, *o*, that is an arc of a circle from the shaft 5, and hence it moves close to the surface of the curved platform *g*, and forms a stop to prevent grain falling upon the upper side of the wire-carrier when it is depressed, and hence the grain will remain in the receiver until the wire-carrier is swung up again.

When the wire-carrier is moved up the end of the wire is held at the twister, the same as usual in grain-binders; hence when the grain is delivered from the receiver by the hinged section *e e'* swinging up, the grain slides down the platform and stops against the said wire. I also provide a curved ledge at 15 in the platform, that serves to check the movement of the grain as it falls down the platform, in order that it may be formed into a more uniform and compact bundle. The ledge 15 in the platform allows the twisting mechanism to be properly located relatively to the wire-carrying arm, and the end of that arm travels above the platform, as aforesaid, and enters an opening in the platform at the ledge 15, so as to pass to the twister.

To consolidate the grain and lessen the strain upon the wire in forming the bundle, I make use of the gathering-arms *p*, that are formed of spring-wire, coiled at the shank around the shaft 5, and secured by the clamping-screws *p'*, that are each made with a hooked end to hook into the wire at the bend thereof, and pass through an eye at the end of the wire, so that the gathering-arms can be adjusted to give more or less pressure on the bundle by turning the arms upon the shaft 5 and then tightening the clamping-screw. The ends of these arms *p'* move clear of the surface of the platform until they reach the ledge or offset 15, where their further movement is arrested; hence the gatherers do not tend to carry the bundle off the platform.

The bundle, after it has been bound, might lie upon the platform, and it would not materially interfere with the wire or the fall of grain to form the next bundle, and the bound bundle would be forced off the platform by the pressure of the gatherers against the next bundle of grain. However, I prefer to deliver each bundle as bound, and for this purpose employ the pushers *s*, that are upon a bar, $s^1$, below the platform, and said bar is reciprocated periodically and the pushers moved up and down by the action of the crank 21 upon the shaft 22.

The shaft 22 receives a complete revolution, and then pauses by the stop-motion pinion 23, that is made without teeth on one part, to allow the teeth of the wheel *n* to be inoperative while the stops 24 rest upon the circular segment 25, and the segment 25 is interrupted at the place where the teeth of *n* gear into the teeth of 23, and give to the same a complete revolution. This stop-motion is similar to that in said patent No. 123,237.

The pushers *s* are upon a frame, $s^2$, that slides upon the bar $s^1$, and the pushers are kept forward by the spring 28; but they can

yield and slide back when necessary, and there are openings through the platform for the pushers *s* to reach the bundle.

The end of the bar $s^1$ slides in a support in the frame, and as the crank rises and moves forward, the pushers act against the bundle, and as soon as it is bound they eject it from the platform, the spring 28 yielding until the bundle is bound and the wire cut.

It will generally be preferable to time the movements so that the pushers *s* will project through the platform *g* and stand nearly in line with the wire as the gavel of grain is delivered down the platform; hence the ends of *s* will form stops, against which the bundle will be consolidated by the gathering-arms *p* as the wire is drawn around the bundle; then the pushers *s* are carried forward and downward, and brought back beneath the bundle and raised, and again carried forward while the wire is being cut and twisted. The spring of the pushers will be compressed as the pushers *s* act against the bundle, and as soon as the wire is cut the spring-pushers will eject the bundle and assume their normal position. By the joint operation of the parts, as aforesaid, the bundle can be consolidated with less risk than heretofore of breaking the wire.

The twister *t*, that operates upon the wire, is a tapering shank, with a T-head similar to that in the patent No. 184,505, and requires no further description. The device for revolving the same is a bevel-pinion, 30, bevel-wheel 31, shaft 32, and pinion 33, acted upon by the segmental gear 35 upon the wheel *m*, and there are stops 36, that rest against the cylindrical segment 37, to prevent the parts moving until the segmental gear 35 reaches the teeth of the pinion 33. This device brings the twister into operation at the correct time.

729 The cutters *u u'* separate the wire coil remaining around the shank the same as in the aforesaid patent; but they are actuated by the toggle-levers *v* $v^1$, that swing upon the bolts 38, and are connected by the turn-buckle screws *w* $w^1$ with the knives or cutters *u u'*, so that the knives can be adjusted as they or the joints wear from time to time, so as to cut the wire properly.

The toggle-levers *v* $v^1$ are connected by the rod $v^2$, and there is a link, 39, to a lever, $w^2$, which has its fulcrum at 40 on the frame of the machine, and is brought into action at the proper time by the cam 42 upon the side of the wheel *m*.

The cutters operate after the wire has been twisted, and they liberate the bundle that has been bound, but allow a coil of wire to remain upon the shank of the twister, as in aforesaid patent.

At the ends of the grain-receiver there are wind-boards *x*, that protect the grain while in said receiver, and from their rear edges the guard-boards *x'* extend down the platform, and are hinged at their upper ends, so as to be adjusted and direct the grain to the binder.

I claim as my invention—

1. The platform *g* and ribs *i*, curved in an arc of a circle from the center of the shaft 5, and having an upward-curved ledge, 15, and an opening for the wire-carrying arm *k*, in combination with said wire-carrying arm *k*, shaft 5, spring gathering-arms *p*, and the wire-

twisting mechanism that is beneath the ledge 15, substantially as set forth.

2. The pushers *s* below the platform, and passing through slots in the platform, and also acting as stops, in combination with the ledge 15, gathering-arms *p*, and wire-carrying arm *k*, substantially as set forth.

3. In a grain-binder, the combination, with the wire-carrier and twisting mechanism, of the pushers *s*, that pass through slots in the platform and act as stops, as and for the purposes set forth.

4. The pushers *s*, fitted to slide upon the bar $s^1$, and the compressing-spring 28, in combination with the actuating-crank 21, shaft 22, and stop-motion gearing, substantially as set forth.

5. In combination with the wire-twister *t*, the adjustable knives or cutters *u u'*, actuating-levers *v* $v^1$, and rod $v^2$, substantially as set forth.

Signed by me this 20th day of December, A. D. 1876.

EDWIN CHAPMAN. [L. S.]

Witnesses:

C. H. CHADBOURN.

THOS. H. McCONNELL.

(No Model.) 2 Sheets—Sheet 1.

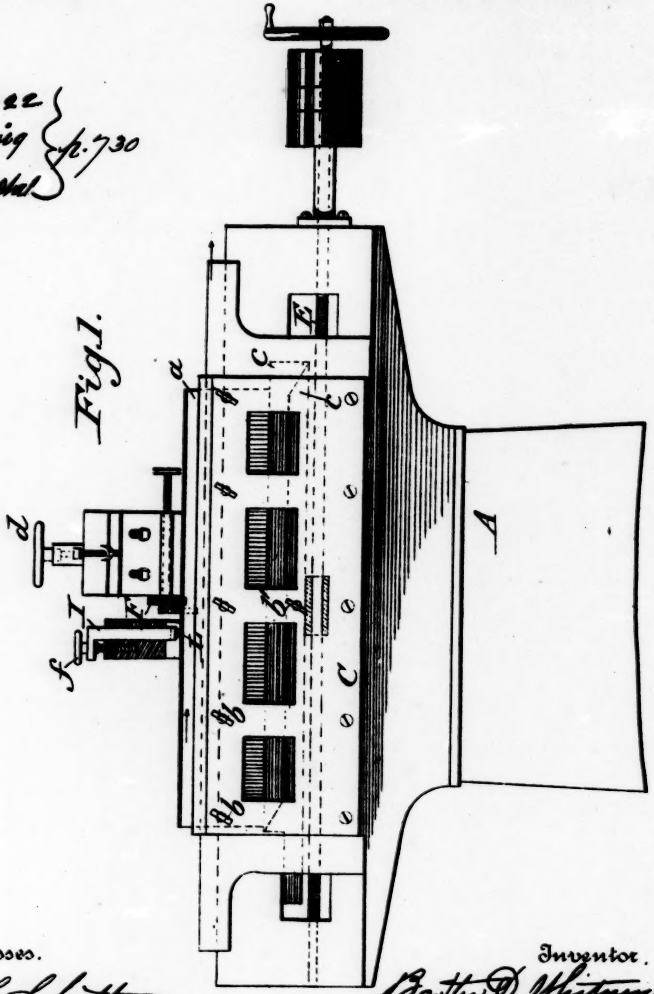
# B. D. WHITNEY.

## SHARPENING MACHINE.

No. 390,931. Patented Oct. 9, 1888.

No. 322
Deering
v.
W. H. W. Co.
p. 730

Fig. 1.




Witnesses.
F. H. Schott.
Fred E. Tasker.

Inventor.
Bartlett D. Whitney.
By his Attorney John C. Tasker.

(No Model.) 2 Sheets—Sheet 2.

# B. D. WHITNEY.

## SHARPENING MACHINE.

No. 390,931. Patented Oct. 9, 1888.

Fig. 2.

No 322 Deering p. 731 W.H.W. del.

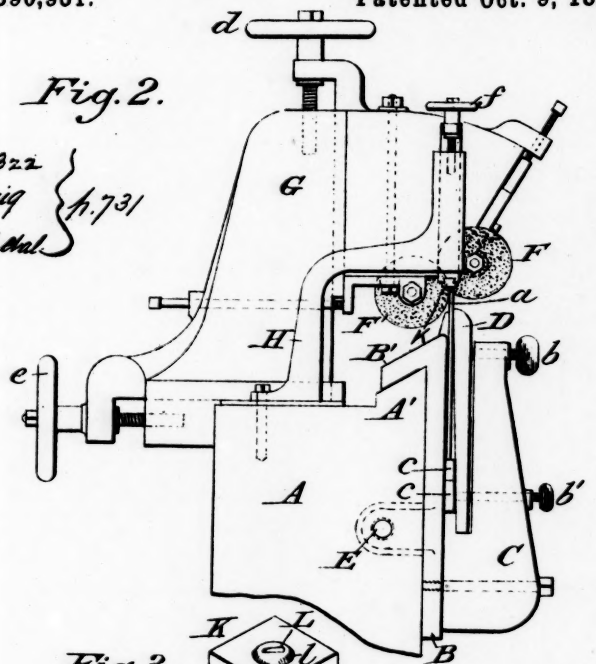



Fig. 3.

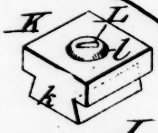
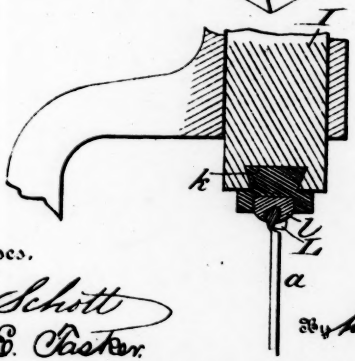



Fig. 4.




Witnesses.

H. C. Schott

Fred E. Foster.

Inventor.

Baxter D. Whitney.

By his Attorney John C. Foster.

732 UNITED STATES PATENT OFFICE.

BAXTER D. WHITNEY, of Winchendon, Massachusetts.

*Sharpening-machine.*

Specification forming part of Letters Patent No. 390,931, dated October 9, 1888. Application filed November 9, 1887. Serial No. 254,685. (No model.)

To all whom it may concern:

Be it known that I, Baxter D. Whitney, a citizen of the United States, residing at Winchendon, in the county of Worcester and State of Massachusetts, have invented certain new and useful improvements in sharpening-machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to certain improvements in sharpening-machines used for the purpose of producing a more perfect scraper-edge than can be produced by hand, and is an improvement on the machine for which letters patent No. 147,536 were granted to me on the 17th day of February, 1874.

It consists, essentially, in a diamond burnisher, with which the ground edge of the scraper-blade is brought into contact, and thereby turned uniformly and perfectly, the object of the invention being to find a material that will withstand and overcome the resistance of the hardened steel edge of the scraper-blade and successfully produce good turned and burnished scraper-edges, there being no means heretofore known of making steel hard enough to successfully perform that duty; and it consists, also, in certain peculiarities in the construction, arrangement, and combination of the parts of the machine with which the burnisher is used, substantially as will be hereinafter described and claimed.

(Here follow diagrams marked pp. 730 & 731.)

In the accompanying drawings, illustrating my invention, figure 1 is a side elevation of my improved machine for grinding and turning a scraper-edge. Fig. 2 is an enlarged left-end elevation of the same. Fig. 3 is an enlarged detail perspective of the diamond burnisher. Fig. 4 is a cross-sectional view of the diamond burnisher with means for supporting it, and shows the manner in which it operates upon the scraper-edge. It also shows in enlarged outline the manner of contact between the diamond and the edge for turning the latter.

Like letters of reference designate like parts throughout all the figures.

A denotes the bed or main supporting-frame of my improved sharpening-machine. It is constructed in any suitable and desirable

manner and of any shape and size that will best adapt it for the purposes in view. Upon one side of this bed, near the top, are arranged the longitudinally-movable devices which carry the knives to be sharpened. These devices consist of a vertical plate, B, having an inclined flange, B′, along its top edge, which is seated upon an inclined face, A′, on the top of the bed A. It will thus be seen that the plate B may be easily made to reciprocate back and forth, its flange B′ sliding upon the face A′. Securely bolted to the plate B is a frame, C. Between the frame C and the plate B is an intervening space in which is located a clamping-jaw, D. Between the clamp-jaw D and the plate B is placed the scraper-blade *a*, and held in the proper position for grinding and also for turning the scraper-edge. The clamping-jaw D is adjusted toward the plate B and away from the frame C by set-screws *b b′*. By means of these screws the jaw D may be set firmly against the blade, so as to hold it immovably in position, or the pressure may be relaxed, so as to permit the easy removal of the blade. Longitudinally between the clamping-jaws D and plate B are placed bars *c c*, (shown best in dotted lines in Fig. 1,) said bars being formed with inclined portions, as shown, so that by moving them longitudinally the height of the upper edge of the upper bar, upon which the blade *a* rests, may be accurately adjusted so as to bring said blade into the proper position relatively to the grinding-wheels or the burnishing-tool.

The reciprocation of the blade-carrying frame-work is effected by any suitable and desirable mechanical means. In the drawings I have shown one way of accomplishing this movement by means of a longitudinal screw, E, which passes through a bearing projecting from the plate B into a slot formed in the bed A for its reception, and which also contains the screw. The outer end of the screw is provided with a hand-wheel for its manipulation. By turning the hand-wheel the blade-carrying devices are moved back and forth, and the blade is consequently passed beneath the grinding and burnishing tools. Upon the shaft of the screw is also placed a pulley, so that power may be applied for the purpose of reciprocating the scraper-plate when it is found inconvenient to do this by hand. The grinding-wheels F F are supported in an elevated transverse frame, G, so that they may be adjusted laterally and vertically to give any form to the scraper-edge required, which will be perfectly straight and true from one end to the other.

733–739

In Fig. 2 it is clearly shown how the scraper-edge and the grinding-wheels are relatively located. It is unnecessary to particularize here concerning the exact structure and arrangement of the transverse frame G. It will be sufficient to state that it is mounted upon the bed-plate and is adjusted vertically by means of a hand-wheel, *d*, and laterally by means of a hand-wheel, *e*. Upon the main bed is also mounted another transverse frame, H, which is intended to carry the burnishing-tool. One form of the frame is shown in Fig. 2. In this frame is arranged a bar, I, which slides vertically directly above the edge of the blade, said vertical adjustment being accomplished and regulated by any suitable device, such as the

hand-wheel *f*. In the lower end of this bar is carried my improved burnishing-tool. Thus by a manipulation of the hand-wheel *f*, the burnishing-tool may be brought into proper contact with the edge of the scraper. The burnishing-tool, which forms the essence of my present invention, is clearly shown in perspective in Fig. 3. It consists of a metallic block, K, having a dovetail, *k*, on one side, said dovetail being preferably tapered, so that when it has been inserted into the dovetailed groove in the lower end of the sliding bar I it will be firmly held therein in a manner to be removable from one side, but not from the other. The wedging form of the dovetail is such that when the scraper is being passed beneath the burnisher the tendency of the pressure upon the burnisher will be to seat the dovetail more firmly in its socket. Obviously, however, the burnisher can easily be removed when pushed from the opposite direction.

The diamond L is set into the face of the metallic block K. In order to make a firm setting, I preferably place a piece of copper, *l*, in the block K, within which copper the diamond is firmly embedded. The diamond is of an elongated shape, its direction of greatest length lying in one of the lines joining two of the corners of the metallic block K. Hence the diamond has an oblique line of contact with the scraper-edge. Further, the edge of the diamond is slightly inclined from one end to the other, so that it does not lie in a plane truly parallel to the surface of the part K, but meets the scraper inclined in two directions. It will therefore be seen that in order to secure the best results in the use of my improved diamond burnisher I preferably impose upon the diamond two conditions as regard its position: first, that it shall be oblique to the direction of the scraper-edge, and, second, that it shall be slightly inclined from the plane of movement of said edge. As regards its inclination from the plane of movement, it may be said that the inclination is approximately in the same direction as that of the ground edge of the scraper, only not so abrupt; hence, when the ground edge of the scraper meets it, it is turned as shown in Fig. 4. After the grinding of the scraper-edge by means of the grinding-wheels F F has been accomplished, the hand-wheel *f* or other device which governs the diamond burnisher will be manipulated so as to bring said burnisher into contact with the ground edge of the scraper, so as to enable said edge to be properly turned to give it the characteristics of a scraper-edge. The blade is then passed beneath the burnisher and in contact with the diamond. The scraper-edge thus produced is uniform and perfect. The manner in which the burnisher turns the edge is shown clearly in the outline diagram of Fig. 4.

I do not intend to confine my invention to the exact arrangement of the diamond hereinabove described; but I claim the right to vary the position and arrangement of the several parts and to locate the diamond in different ways for the purpose of accomplishing the same object.

Having thus described my invention, what I claim as new, and desire to secure by letters patent, is—

1. In a machine for grinding and turning a scraper-edge, a burnishing-tool consisting of a diamond arranged to act upon the blade, substantially as described.

2. In a machine for sharpening and turning the edge of scraper-blades, the grinding-wheels and the diamond burnisher, arranged and operating as set forth.

3. In a machine for grinding and turning the edges of scraper-blades, a firmly-set diamond having an elongated shape and arranged to act upon the blade, for the purpose specified.

4. In a machine for turning the edges of scraper-blades, a diamond burnisher consisting of a diamond having an elongated shape and arranged to meet the scraper-blade obliquely thereto, substantially as described.

5. In a machine for turning the edges of scraper-blades, the diamond burnisher consisting of a diamond having an elongated shape and arranged to meet the scraper-blade obliquely thereto and inclined from the plane of movement of the edge of said scraper-blade, substantially as described.

6. In a machine for grinding and turning the edges of scraper-blades, the grinding-wheels and diamond burnisher consisting of an elongated diamond whose edge is oblique to the edge of the scraper and inclined from the plane of movement of said scraper, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

BAXTER D. WHITNEY.

Witnesses:
SAM'L A. PARKER.
WM. M. WHITNEY.

J. H. ELWARD,

2 Sheets—Sheet 1.

Assignor to THE ST. PAUL HARVESTER WORKS

# Harvester.

No. 9,179. Reissued April 27, 1880.

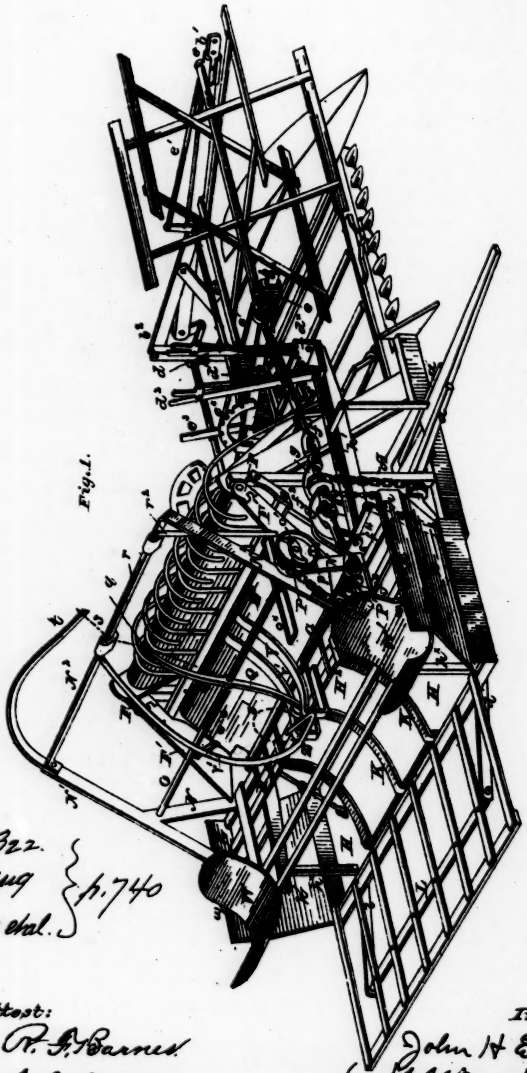


Fig. 1.

No. 322.
Deering
v.
W. H. W. et al.
p. 740

Attest:
R. F. Barnes
J. S. Barker

Inventor:
John H. Elward
by D. W. Bouldday atty

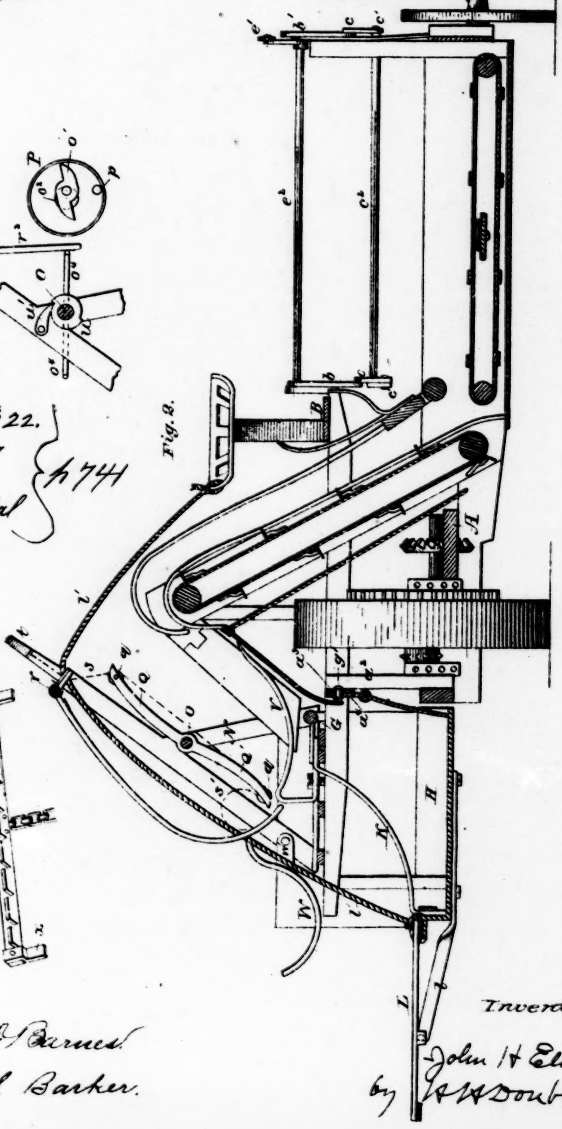
2 Sheets—Sheet 2.

# J. H. ELWARD,

Assignor to THE ST. PAUL HARVESTER WORKS.

## Harvester.

No. 9,179. Reissued April 27, 1880.




No. 322.
D E Ering
v.
W. H. Wetal
p 741

Attest:
R. F. Barnes
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742 UNITED STATES PATENT OFFICE.

JOHN H. ELWARD, of Stillwater, assignor to the St. Paul Harvester Works, of St. Paul, Minnesota.

*Harvester.*

Specification forming part of Reissued Letters Patent No. 9179, dated April 27, 1880. Original No. 177,231, dated May 9, 1876. Application for reissue filed June 12, 1879.

To all whom it may concern:

Be it known that I, John H. Elward, of Stillwater, in the county of Washington and State of Minnesota, have invented certain new and useful improvements in harvesters; and I do hereby declare that the following is a full, clear, and exact description of the invention, that will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

(Here follow diagrams marked pp. 740 & 741.)

Figure 1 is a perspective view of a harvesting-machine embracing my improvements. Fig. 2 is a transverse vertical section through the same, and Figs. 3 and 4 are detached views of parts of the machine hereinafter described.

Similar letters of reference denote corresponding parts wherever used.

My invention relates, first, to a novel arrangement of means for effecting the desired adjustments of the reel; second, to a novel arrangement of delivery-chute in connection with the grain-receiver and dumping-tray; third, to means for determining the position of the gavel relative to the bundling devices; fourth, to the bundling devices themselves; and, lastly, to certain details hereinafter fully described.

The machine in its general organization is similar to many now in use, and it need therefore be described only so far as is necessary to an understanding of my improvements.

In the accompanying drawings, A represents the gear-plank or main longitudinal bar of the main frame, upon which the driving-gearing of the machine is mounted in a manner described in a former application. This gear-plank is located upon the grain side of the drive-wheel, and has its forward end slotted or bifurcated, as shown in Fig. 1, and within the slot thus formed one of the tongue or pole straps *a a* is placed, the other strap being placed at the side of the pole-plank. The two straps thus clasping one of the arms of the gear-plank snugly between them and being pivoted thereto at their rear ends by a through-bolt, lateral relative play of the main frame and tongue is effectually prevented, thus giving great steadi-

ness to the movement of the machine without interfering with its vertical adjustment.

B is the seat-plank, supported above the inclined elevator or inner end of the platform-carrier by transverse bars arranged in front and in rear of the elevator in a well-known way, and about midway of the length of this seat-bar is secured an upright, to which the inner reel-bearer, $b$, is pivoted at or near or slightly in rear of its center. $b'$ is the outer reel-bearer, pivoted in a similar manner and in the same transverse line in a frame or support, $b^2$, secured to the rear outer corner of the platform-frame, as shown in Fig. 2. The rear ends of these reel-bearers are connected by links $c$ with crank-arms $c'$ on a transverse rock-shaft, $c^2$, mounted in suitable bearings at the rear of the platform-frame, the arrangement being such that when any vibration is imparted to one of the reel-bearers a corresponding movement is imparted through the rock-shaft and links to the other bearer, thus simultaneously adjusting both ends of the reel-shaft supported upon the forward ends of said bearers.

Upon the forward end of the seat-plank B is mounted a bell-crank lever, $d$, connected by a link, $d'$, with the forward arm of the reel-bearer $b$, by means of which the reel-bearers can be adjusted by the driver at will, a rack at $d^3$ and any usual form of thumb-latch serving to hold the lever at any desired adjustment.

The reel-shaft has its bearings in sliding boxes $e$ $e$, placed on the forward ends of the bearers $b$ $b$, and these boxes are connected by links $e'$ $e'$ with crank-arms on a rock-shaft, $e^2$, which, in this instance, serves as the pivotal center of the reel-bearers. The inner end of this rock-shaft is provided with a lever, $e^3$, by vibrating which the reel-shaft can be moved forward or backward at the will of the driver, as the nature of the work may require, a rack, $e^4$, serving to hold the lever at any desired adjustment.

To accommodate the adjustments of the reel, as described, the reel is connected at its inner end, by a tumbling-joint, with an extensible shaft, $f$ $f'$, which, at its opposite end, is connected by a
743 similar joint with a driving-shaft, $f^2$, mounted in fixed bearings $g$ $g$, attached to the front of the elevator-frame, in such relation thereto as to be about in line with the reel-shaft in its usual or more frequent position, and around an extension of which line the reel is adjusted. By this arrangement the reel can be driven with equal facility under any adjustment, while the shaft $f^2$, being unaffected by these adjustments, may be driven by any usual or preferred arrangement of gearing or driving belts or chains connecting it with the driving-wheel.

The platform apron or carrier and the elevator-apron are made in any usual or preferred form, except that I prefer to connect the aprons and the slats thereon with an endless driving-chain placed inside of the endless apron, and about midway of its width from front to rear, and traveling upon sprocket-wheels or grooves on the apron-rollers midway of their length. By this arrangement the strain or tension and wear upon the apron is in a great measure avoided, while at the same time the tendency of the apron to sag at its center is obviated.

The inclined delivery-board E, down which the grain passes from the elevator to the binders' grain-receiver, and said receiver itself, except in particulars hereinafter recited, may be of any usual or preferred construction.

To the end boards of the elevator-frame, or to blocks F, connected therewith, are hinged by their upper ends two gaveling-boards, F′, one at the front and the other at the rear of the delivery-board E. The board E is provided at each end, near its lower edge, with a series of perforations, at *i*, arranged in the arcs of circles, of which the hinges to the boards F′ are the centers, and the lower edges of the boards F′ have each a pin, which may be placed in any one of its respective series of holes, for adjusting the angle of the boards and thus giving direction to the movement of the descending grain for placing the gavel farther forward or farther back, as described.

The main frame, at its stubble side, has an upright frame, (indicated at $a^2$, Fig. 2,) $a^3$ representing a longitudinal bar, and the binders' stand or platform H, on its adjacent side, has a similar upright framing and longitudinal bar $a^4$, and these bars $a^3$ $a^4$, about midway of their length, are connected by a horizontal pivot, $g'$, upon which the binders'-platform frame is suspended, and upon which, also, it is adapted to be swung or vibrated for the purpose of maintaining its horizontal position under the different adjustments of the main frame.

The forward end of the binders'-platform frame is connected by a link, *h*, with the rock-shaft *h′*, through which, by means of a lever, $h^2$, the driver adjusts the height of the cutting apparatus, the arrangement being such that as the main frame is vibrated for changing the height of the cutters the binders' platform is correspondingly vibrated relative thereto for preserving its horizontality.

G is the grain-receiver, consisting of a pivoted longitudinal rod provided with a series of horizontal fingers adapted to receive and hold the grain to be bound. Just under this receiver is located the inner side of the binders'-table frame, H′, composed of a series of longitudinal bars connected by transverse bars, and forming a slotted rectangular table, open centrally at $H^2$, to accommodate the binders standing on the binders' platform H. This table is hinged at its outer edge to the upright platform-frame, and has its outer edge supported by hinged feet $h^3$, resting in sockets on the platform H, adapting it to be folded out of the way when not in use.

The platform H has a vertical rim extending around it, giving it the form of a shallow box or receptacle for heads and loose grain that may become separated in the process of binding, &c., and the table-frame is provided at its ends which project beyond the platform with end boards, *k*, to which boards *k′* are hinged by their upper edges, and said boards, inclining inward, as shown, have their lower ends located within this shattered-grain receptacle, for insuring the deposit of the loose or shattered grain therein.

The platform H has arms *l l* projecting from its outer side, in the outer ends of which the longitudinal pivot of the bundle carrier and dumper L has its bearings, said dumping-carrier being arranged

about in the same horizontal plane with the upper edge of the rim of the platform H, as shown.

K is an inclined or concave chute, extending between the elevated binders' receptacle and the inner edge of the bundle-carrier, as shown, the arrangement being such that when the bound bundles are released at the outer edge of the receptacle G they are automatically conveyed to and deposited upon the bundle-carrier. The chute K is, by preference, made of the inclined curved bars or slats arranged between the binders; but it may be in a single wide piece, if desired.

A cord, $l'$, extends from the inner edge of the dumping-carrier L, through suitable guides, to the driver's seat, for enabling the driver to dump said carrier whenever it is desired.

Upon the slatted table H′ is placed a removable bundling attachment, constructed as follows, viz: At or near each end of said binders' table is an upright triangular frame, N, the lower or horizontal bar of which rests on the slats of the table, and has a button which, when turned longitudinally, passes between and below the slats, when, being turned transversely, it engages with the slats and fastens the end frames, N, thereto.

The outer inclined bars, N′, of the frames N extend beyond the apex of the frames, and are united at their upper ends by a horizontal bar, $N^2$, and at or near said apex said frames are further united by a horizontal shaft, O, to which motion is imparted by a cone-pulley or sprocket-wheel, P, mounted loosely on its for-
744 ward end, and connected therewith as follows: The forward end of the shaft O has a cross-head, $o'$, rigidly connected with it, (see Fig 3,) and directly in rear of said cross-head the shaft has an eccentric, $o^2$, formed upon it, which forms the journal for the cone-wheel P.

The forward face of the cone-wheel has a pin or spur, $p$, formed upon it near its periphery, and as the wheel is rotated the pin strikes one of the arms of the cross-head $o'$, and through said arm imparts a rotary movement to the shaft until, by the eccentric relation of the wheel to the cross-head, the pin $p$ moves outward sufficiently far to escape from the one arm of the cross-head, leaving the opposite arm in position to be acted upon by the pin in its turn. By this arrangement an intermitting movement is imparted to the shaft O, and it is allowed to remain stationary during just one-half the revolution of the wheel P, for a purpose which will be hereinafter explained.

The speed of the shaft O is regulated by the cone-pulleys, upon any one of the series of which the driving band or chain may operate, according to the necessities of the work, said chains being driven from one of a corresponding series of cone-pulleys, (indicated by dotted lines at P″, Fig. 1,) the shaft of the latter series of cone-pulleys being connected through bevel-wheels with a transverse shaft, $f^3$, which, in turn, is connected by a tumbling extensible shaft, $f^4$, with the shaft $f^2$, which drives the reel. By this arrangement I provide for the driving of the shaft O under all the varying

relations of the swinging binders' platform and tables to the main frame.

Upon the shaft O, about midway of its length, is secured a cross arm or arms, Q, made preferably in the curved or S form shown, connected centrally to the shaft, and provided at its ends with horizontal pins or studs, on which are mounted small grooved rollers $q$, for a purpose which will be explained.

The upper bar, $N^2$, of the bundling-frame is provided with suitable bearing-brackets, in which is mounted a rock-shaft, $r$, the rear end of which is provided with a curved angular arm, $r'$, the outer swinging end of which overhangs and extends downward in close proximity with the outer edge of the binders' grain-receptacle G, as shown. A cord, $s$, is connected at one end with the swinging end of arm $r'$, and extending up through the plane of the circle in which the grooved rollers $q$ are carried by the arm Q, and through a guiding-eye in the bar $N^2$, has its upper end connected with a spring, $t$, connected to the frame N or frame-bar $N^2$, as shown, said spring serving at all times to hold the cord $s$ taut.

The forward end of rock-shaft $r$ has an arm, $r^2$, attached, which extends down sufficiently far to engage with one of two arms or stops, $o^4$ $o^4$, on the shaft O, and which serves, when a bundle is in position and compressed, as hereinafter explained, to hold the arm $r'$ with its cord in proper position for holding the bundle.

The shaft O, in rear of the forward frame, N, is provided with a cam or ratchet disk, $u$, (see Fig. 3,) and a pawl, $u'$, pivoted to the frame N, engages with said ratchet-disk and prevents the backward rotation of the shaft O when the cross-head $o'$ is released from the pin $p$ on its driving-wheel P.

Where the bundling attachment above described is used a concave composed of two or more parallel bars, V, is arranged above and rests upon the ordinary grain-receiver, as shown, or it may be in the form of a slotted concave, in which the grain discharged by the elevator is deposited, V′ representing the slot in which the bundling-arms Q move for gathering and compressing the grain.

The operation of these devices is as follows: Supposing a sufficient quantity of grain to be in the concave V to form a bundle, a half-revolution is imparted to the shaft O by the wheel P through the connections described, imparting a continuous movement to the cross-head or bundling-arms Q. The grooved pulleys on the upper arm strike against the cord $s$, and pressing it before it carries it over and behind the grain in the concave down through the slot V′ and underneath the grain until the arm Q′ comes close to the arm $r'$, to which one end of said cord is attached, thereby forming a loop (see dotted line at $s'$) in the cord $s$, encircling or nearly encircling the bundle. When the arm Q or Q′ has reached this position the stops $o^4$ and $u$ $u'$ come into play, as described, and hold the arms Q and $r'$ while another gavel accumulates behind the arm Q′, giving the operator ample time to apply the band. During this operation, it will be seen, the bundle is tightly compressed by the cord $s$, which is held under tension by the spring $t$, the bundle being thus completed by the time the wheel P has completed its half-revolution necessary to again

connect it with the shaft O, as has been explained, when, by further movement of said shaft, the arm $r'$ is released and the cord $s$ is retracted into its former right line, releasing the bundle, which is crowded outward by the following arm Q', and descends over the chute K upon the dumping-carrier, when the operation is repeated, as before.

By the arrangement of adjustable shields in connection with the grain-receptacle, as described, the attendant is enabled to regulate with precision the delivery of the grain relative to the bundling or binding devices or to the position of the binders. Thus, where the bundling devices described in another application are employed and the machine is operating upon short grain, in order to deposit it in the receptacle with the center of its length of straw in the same transverse plane with said bundling devices, it is desirable to swing the lower end of the forward shields backward, in order to move the grain backward in its descent into the proper relation to said devices, and to prevent its being carried too far the rear shield may be swung forward and secured at the desired point. When the straw is long the shields will be correspondingly moved outward or away from each other in order to deposit the grain in the proper relation to the binders or to the bundling or binding devices.

It is well known that it is practically indispensable that the band be placed very near the center of the gavel, and it will also be readily seen that it is very desirable that in machines of this class there should be some provision by which the butt-ends of the straw shall be evened, and shall also be delivered at such point relative to that part of the mechanism at which the band is passed around the gavel that such band shall be placed near the center of the bundle. These results are secured in my construction, and the capabilities and usefulness of the machine are greatly increased thereby.

It will also be seen that the gavel-boards are supported upon the machine independently of the chute or delivery-board or the grain-receiver—that is to say, the lower edge of the gavel-board is arranged above the upper face of the chute-board, and is not permanently attached to said chute, for which reason the chute or receiver can be moved below the gavel-board should such operation be found desirable.

I do not claim to be the first to construct a harvester with a board arranged at the end of the chute or delivery-board, as the patent to Renwich and Watson, dated December 6, 1853, shows boards at both ends of their chute; but in their construction such boards were employed as a part of the frame-work of the machine, and they certainly did not employ them to guide the grain to the desired point during its passage over the chute, because their drawing shows the grain having its butts and tips some distance removed from the boards; and, further, because they state explicitly that they propose to regulate the delivery of the grain over the chute by shifting the position of the upper end of the elevator.

I do not claim, broadly, a vertical board arranged at the end of

the chute or delivery-board, irrespective of its relation to the other parts of the machine or of its function.

It is also apparent that some of the advantages growing out of the use of these shields in machines which can be tilted forward (in order to cut short or lodged grain) may be had without adjusting them or moving their lower ends inward, from the fact that, even though the lower ends remain stationary, the shields will still prevent the short grain or tangled grain from sliding off at the front end of the grain-receiver or becoming entangled with the driving-chains or other mechanism which is arranged near the end of the grain-receiver or the delivery-board.

W W′ represent band-trays for carrying either prepared bands or straw suitable for bands. These are provided with suitable lugs or ears *w*, adapting them to be readily attached to or disengaged from the table H or frames N, either or both, as preferred. Additional bands or straw therefor may be carried underneath the chute K and at the ends of the binders' platform and shattered-grain receptacle.

When the bundling attachment described is removed, the dumping-table may be raised to the plane of the tables H′—its usual position and under its usual arrangement—if preferred.

The slats of the elevator-apron, to prevent them from lagging or being deflected backward in passing over the rollers, have little angular brace-straps *x* connected to them at their ends, the feet of which rest upon the apron in rear of the slats, and so hold them up to their work. Or, instead of these, if preferred, leather or other yielding straps may be made to hold the slats by being connected therewith and with the apron in advance of the slats.

Having now described my invention, what I claim as new, and desire to secure by letters patent, is—

1. In a harvesting-machine, the combination, substantially as set forth, of the following elements, viz: A chute or delivery-board over which the grain passes after leaving the elevator, a grain-receiver which receives the grain from the chute or delivery-board, a platform which supports the binders, and a shield or gavel-board to determine the direction of the grain in its passage over the chute.

2. In a harvesting-machine, the combination, substantially as set forth, of the following elements, viz: A chute or delivery-board over which the grain passes after leaving the elevator, and a gavel-board suspended above the chute or delivery-board to determine the direction of the grain in its passage over the chute.

3. In a harvesting-machine, the combination, substantially as set forth, of the following elements, viz: A chute or delivery-board over which the grain passes after leaving the elevator, mechanism which grasps the grain and compresses it into bundles, and mechanism whereby the distance between the binding devices and the gavel-board above the chute or delivery-board may be increased or diminished, to insure that the grain shall be directed to the proper point for binding.

4. In a harvesting-machine, the combination, substantially as set forth, of the following elements, viz: A main frame supported upon two wheels and carrying a cutting apparatus, a hinged tongue, and

device adapted to be operated by the driver for tilting the machine upon its carrying-wheels, a carrier which receives the cut grain and delivers it to the elevator, an elevator which elevates the grain over the main driving or supporting wheel, a chute or delivery-board which receives the grain from the elevator, and a gavel-board to determine the direction of the grain in its passage over the chute.

5. In a harvesting-machine, the combination, substantially as set forth, of the following elements, viz: A main frame supported upon two wheels and carrying a cutting apparatus, a hinged tongue,
746 a device adapted to be operated by the driver for tilting the machine upon its carrying-wheels, a carrier which receives the grain and delivers it to the elevator, an elevator which elevates the grain over the main driving and supporting wheel, a chute or delivery-board which receives the grain from the elevator, a grain-receiver which receives the grain from the chute or delivery-board, and a gavel-board to determine the direction of the grain in its passage over the chute.

6. In a harvesting-machine, the combination, substantially as set forth, of the following elements, viz: A main frame supported upon two wheels and carrying a cutting apparatus, a hinged tongue, mechanism for adjusting the height of the machine upon the main carrying and driving wheel, mechanism adapted to be operated by the driver for tilting the machine upon the carrying-wheels a carrier which receives the cut grain and delivers it to the elevator, an elevator which elevates the grain over the main driving and supporting wheel, a chute or delivery-board which receives the grain from the elevator, and a gavel-board to determine the direction of the grain in its passage over the chute.

7. The reel mounted in sliding boxes on the pivoted reel-bearers *b b'*, in combination with the rock-shaft $e^2$, connecting-links *e'*, and adjusting-levers *d* $c^3$, all arranged and operated as described.

8. The gear-plank, slotted or forked at its forward end, in combination with the tongue-traps, arranged to stride one of the arms of said gear-plank, as described.

9. The dumping bundle-carrier L, in combination with the inclined delivery-chute K, extending between the binders' grain-receiver and said carrier, and arranged in the described relation thereto, substantially as and for the purposes set forth.

10. The binders'-carriage frame, suspended from the main frame on a transverse pivot arranged at or near its upper edge, and adapted to be vibrated thereon by means of the rock-shaft and connecting-link *h*, arranged and operated substantially as described.

11. The rotating bundling-arm Q, in combination with the compressing-cord *s*, arranged and operated substantially as described.

12. The shaft of the bundling-arm Q, having the eccentric arrangement to its driving-wheel P, in combination with the arms or cross-head *o'* and actuating pin or tooth *h*, arranged and operated as described.

13. The bundling-arms Q and the vibrating arm *r'*, to which the compressing cord or strap is connected, in combination with the

stops $o^4$ and $u'$, for locking said arms in position while the gavel is being bound, substantially as described.

14. The combination of the shaft O, the devices which impart an intermittent rotation to said shaft, the gaveling-arms Q, mounted upon said shaft, and the cone-pulleys P, substantially as and for the purposes described.

15. The bundling attachment consisting of the frame N N′, with its bundling-shaft O, arm Q, and compressing devices, made removable as a whole when desired, substantially as and for the purposes set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 22d day of May, 1879.

J. H. ELWARD.

Witnesses:

G. ROOSEN.

H. J. CHAMBERS.

750 UNITED STATES PATENT OFFICE.

JOHN H. ELWARD, of St. Paul, Minnesota, assignor to St. Paul Harvester Works, of same same place.

## *Improvement in Harvesters.*

Specification forming part of Letters Patent No. 177,231, dated May 9, 1876; application filed March 14, 1876.

To all whom it may concern:

Be it known that I, John H. Elward, of St. Paul, county of Ramsey, State of Minnesota, have invented a new and useful improvement in harvesting-machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification, in which—

(Here follow diagrams marked pp. 747 & 749.)

Figure 1 is a perspective view of a harvesting-machine embracing my improvements. Fig. 2 is a transverse vertical section through the same; and Figs. 3 and 4 are detached views of parts of the machine hereinafter described.

Similar letters of reference denote corresponding parts wherever used.

My invention relates, first, to a novel arrangement of means for effecting the desired adjustments of the reel; second, to a novel arrangement of the delivery-chute in connection with the grain-receiver and dumping-tray; third, to the bundling devices themselves; and lastly to certain details hereinafter fully described.

The machine, in its general organization, is similar to many now in use, and it need therefore be described only so far as is necessary to an understanding of my improvements.

In the accompany- drawings, A represents the gear-plank or main longitudinal bar of the main frame, upon which the driving-gearing of the machine is mounted, in a manner described in a former application. This gear-plank is located upon the grain side of the drive-wheel, and has its forward end slotted or bifurcated, as shown in Fig. 1, and within the slot thus formed one of the tongue or pole straps *a a* is placed, the other strap being placed at the side of the pole-plank, the two straps thus clasping one of the arms of the gear-plank snugly between them, and, being pivoted thereto at their rear ends by a through-bolt, lateral relative play of the main frame and tongue is effectually prevented, thus giving great steadiness to the movement of the machine without interfering with its vertical adjustment. B is the seat-plank, supported above the inclined elevator or inner end of the platform-carrier by transverse bars arranged in front and in rear of the elevator in a well-known way, and about midway of the length of this seat-bar is secured an upright, to which the inner reel-bearer *b* is pivoted at or near or

2 Sheets—Sheet 1.

J. H. ELWARD.

HARVESTER.

No. 177,231. Patented May 9, 1876.

No. 322.
Deering
v.
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p. 747

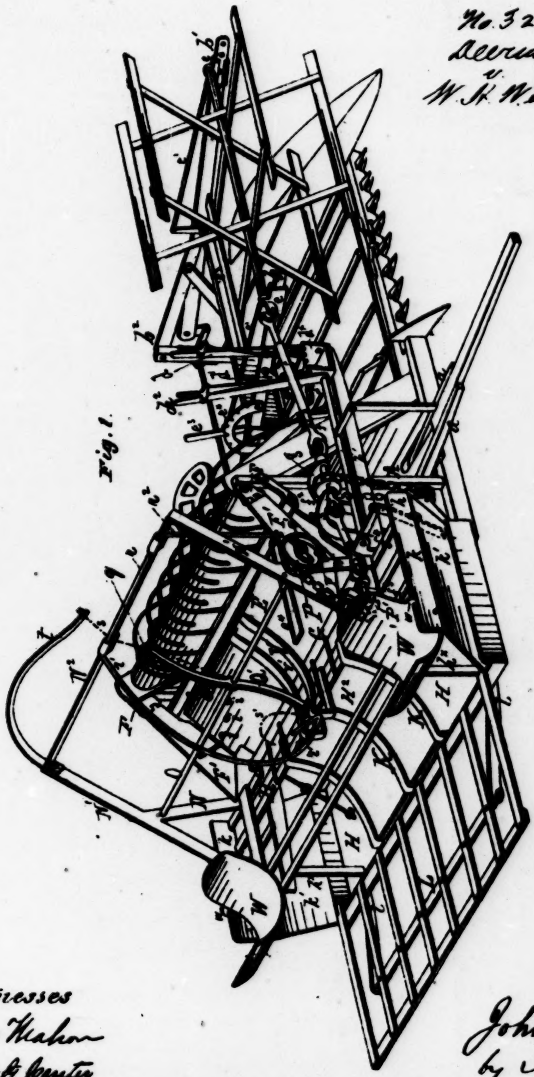

Fig. 1.

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2 Sheets—Sheet 2.

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HARVESTER.

No. 177,231. Patented May 9, 1876.

No. 322
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v.
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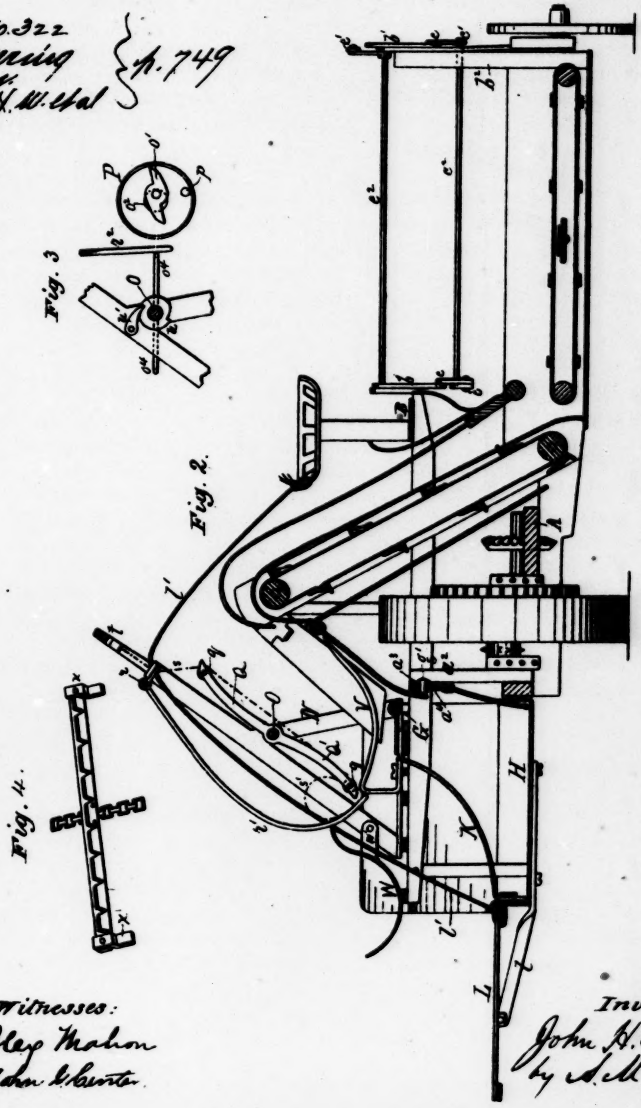


Witnesses:
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slightly in rear of its center. $b^1$ is the outer reel-bearer pivoted in a similar manner, and in the same transverse line in a frame or support, $b^2$, secured to the rear outer corner of the platform-frame, as shown in Fig. 2. The rear ends of these reel-bearers are connected by links $c$ with crank-arms $c^1$, on a transverse rock-shaft, $c^2$, mounted in suitable bearings at the rear of the platform-frame, the arrangement being such that when any vibration is imparted to one of the reel-bearers a corresponding movement is imparted through the rock-shaft and links to the other bearer, thus simultaneously adjusting both ends of the reel-shaft supported upon the forward ends of said bearers.

Upon the forward end of the seat-plank B is mounted a bell-crank lever, $d$, connected by a link, $d'$, with the forward arm of the reel-bearer $b$, by means of which the reel-bearers can be adjusted by the driver at will, a rack at $d^3$ and any usual form of thumb-latch serving to hold the lever at any desired adjustment.

The reel-shaft has its bearings in sliding boxes $e$ $e$, placed on the forward ends of the bearers $b$ $b$, and these boxes are connected by links $e^1$ $e^1$ with crank-arms on a rock-shaft, $e^2$, which in this instance also serves as the pivotal center of the reel-bearers. The inner end of this rock-shaft is provided with a lever, $e^3$, by vibrating which the reel-shaft can be moved forward or backward at the will of the driver, as the nature of the work may require, a rack, $e^4$, serving to hold the lever at any desired adjustment.

To accommodate the adjustments of the reel, as described, the reel is connected at its inner end, by a tumbling-joint, with an extensible shaft, $f$ $f^1$, which, at its opposite end, is connected, by a similar joint, with a driving-shaft, $f^2$, mounted in fixed bearings $g$ $g$ attached to the front of the elevator-frame, in such relation thereto as to be about in line with the reel-shaft in its usual or more frequent position, and around an extension of which line the
751 reel is adjusted. By this arrangement the reel can be driven with equal facility under any adjustment, while the shaft $f^2$, being unaffected by these adjustments, may be driven by any usual or preferred arrangement of gearing or driving belts or chains connecting it with the driving-wheel.

The platform-apron or carrier and the elevator-apron are made in any usual or preferred form, except that I prefer to connect the aprons and the slats thereon with an endless driving-chain placed inside of the endless apron and about midway of its width, from front to rear, and traveling upon sprocket wheels or grooves on the apron-rollers midway of their length.

By this arrangement the strain or tension and wear upon the apron is in great measure avoided, while, at the same time, the tendency of the apron to sag at its center is obviated.

The inclined delivery-board E, down which the grain passes from the elevator to the binders' grain-receiver, and said receiver itself, except in particulars hereinafter recited, may be of any usual or preferred construction.

To the end boards of the elevator-frame, or to blocks F, connected

therewith, are hinged, by their upper ends, two gaveling-boards, F′, one at the front and the other at the rear of the delivery-board E.

The board E is provided at each end, near its lower edge, with a series of perforations at *i*, arranged in the arcs of circles, of which the hinges to the boards F′ are the centers, and the lower edges of the boards F′ have each a pin, which may be placed in any one of its respective series of holes for adjusting the angle of the boards, and thus giving direction to the movement of the descending grain for placing the gavel farther forward or father back, as described.

The main frame, at its stubble side, has an upright frame, indicated at $a^2$, Fig. 2, $a^3$ representing a longitudinal bar, and the binder's stand or platform H, on its adjacent side, has a similar upright framing and longitudinal bar $a^4$, and these bars $a^3$ $a^4$ about midway of their length, are connected by a horizontal pivot, $g^1$, upon which the binders' platform-frame is suspended, and upon which, also, it is adapted to be swung or vibrated, for the purpose of maintaining its horizontal position under the different adjustments of the main frame.

The forward end of the binders' platform-frame is connected by a link, *h*, with the rock-shaft $h^1$, through which, by means of a lever, $h^2$, the driver adjusts the height of the cutting apparatus, the arrangement being such that, as the main frame is vibrated for changing the height of the cutters, the binders' platform is correspondingly vibrated relatively thereto, for preserving its horizontality.

G is the grain-receiver, consisting of a pivoted longitudinal rod, provided with a series of horizontal fingers, adapted to receive and hold the grain to be bound. Just under this receiver is located the inner side of the binders' table frame $H^1$, composed of a series of longitudinal bars, connected by transverse bars and forming a slotted rectangular table, open centrally at $H^2$ to accommodate the binders standing on the binders' platform H. This table is hinged at its inner edge to the upright platform-frame, and has its outer edge supported by hinged feet $h^3$ resting in sockets on the platform H, adapting it to be folded up out of the way when not in use.

The platform H has a vertical rim extending around it, giving it the form of a shallow box or receptacle for heads and loose grain that may become separated in the process of binding, &c., and the table-frame is provided at its ends, which project beyond the platform, with end boards *k*, to which boards *k*′ are hinged, by their upper edges, and said boards inclining inward, as shown, have their lower ends located within this shattered-grain receptacle for insuring the deposit of the loose or shattered grain therein.

The platform H has arms *l l* projecting from its outer side, in the outer ends of which the longitudinal pivot of the bundle-carrier and dumper L has its bearings, said dumping-carrier being arranged about in the same horizontal plane with the upper edge of the rim of the platform H, as shown. K is an inclined or concave chute extending between the elevated binders' receptacle and the inner edge of the bundle-carrier, as shown, the arrangement being such that when the bound bundles are released at the outer edge of the

receptacle G it is automatically conveyed to and deposited upon the bundle-carrier. The chute K is, by preference, made of the inclined curved bars or slats, arranged between the binders; but it may be in a single wide piece, if desired.

A cord, $l'$, extends from the inner edge of the dumping-carrier L, through suitable guides, to the driver's seat, for enabling the driver to dump said carrier whenever it is desired.

Upon the slatted table $H^1$ is placed a removable bundling attachment, constructed as follows, viz: At or near each end of said binders' table is an upright triangular frame, N, the lower or horizontal bar of which rests on the slats of the table, and has a button, which, when turned longitudinally, passes between and below the slats, when, being turned transversely, it engages with the slats and fastens the end frames N thereto.

The outer inclined bars $N^1$ of the frames N extend beyond the apex of the frames, and are united at their upper ends by a horizontal bar, $N^2$, and at or near said apex said frames are further united by a horizontal shaft, O, to which motion is imparted by a cone-pulley or sprocket-wheel, P, mounted loosely on its forward end, and connected therewith as follows: The forward end of the shaft O has a cross-head, $o^1$, rigidly connected with it, (see Fig. 3,) and directly in rear of said cross-head the shaft has an eccentric, $o^2$, formed upon it, which forms the journal for the cone-wheel P.

752 The forward face of the cone-wheel has a pin or spur, $p$, formed upon it near its periphery, and as the wheel is rotated the pin strikes one of the arms of the cross-head $o^1$, and, through said arm, imparts a rotary movement to the shaft, until, by the eccentric relation of the wheel to the cross-head, the pin $p$ moves outward sufficiently far to escape from the one arm of the cross-head, leaving the opposite arm in position to be acted upon by the pin in its turn.

By this arrangement an intermitting movement is imparted to the shaft O, and it is allowed to remain stationary during just one-half the revolution of the wheel P, for a purpose which will be hereinafter explained.

The speed of the shaft O is regulated by the cone-pulleys upon any one of the series of which the driving band or chain may operate according to the necessities of the work, said chains being driven from one of a corresponding series of cone-pulleys, indicated by dotted lines at P', Fig. 1, the shaft of the latter series of cone-pulleys being connected through bevel-wheels with a transverse shaft, $f^3$, which in turn is connected by a tumbling extensible shaft, $f^4$, with the shaft $f^2$, which drives the reel.

By this arrangement I provide for the driving of the shaft O under all the varying relations of the swinging binders' platform and tables to the main frame.

Upon the shaft O, about midway of its length, is secured a cross arm or arms, Q, made preferably in the curved or S form shown, connected centrally to the shaft, and provided at its ends with horizontal pins or studs, on which are mounted small grooved rollers, $q$, for a purpose which will be explained. The upper bar $N^2$ of the bundling-frame is provided with suitable bearing-brackets, in

which is mounted a rock-shaft, $r$, the rear end of which is provided with a curved angular arm, $r^1$, the outer swinging end of which overhangs and extends downward in close proximity with the outer edge of the binders' grain-receptacle G, as shown. A cord, $s$, is connected at one end with the swinging end of arm $r^1$, and extending up through the plane of the circle in which the grooved rollers $q$ are carried by the arm Q, and, through a guiding-eye in the bar $N^2$, has its upper end connected with a spring, $t$, connected to the frame N or frame-bar $N^2$, as shown, said spring serving at all times to hold the cord $s$ taut. The forward end of rock-shaft $r$ has an arm, $r^2$, attached, which extends down sufficiently far to engage with one of two arms or stops, $o^4$ $o^4$, on the shaft O, and which serves, when a bundle is in position and compressed, as hereinafter explained, to hold the arm $r^1$ with its cord in proper position for holding the bundle. The shaft O, in rear of the forward frame N, is provided with a cam or ratchet-disk, $u$, (see Fig. 3,) and a pawl, $u'$, pivoted to the frame N, engages with said ratchet-disk, and prevents the backward rotation of the shaft O when the cross-head $o^1$ is released from the pin $p$ on its driving-wheel P.

Where the bundling attachment above described is used, a concave composed of two or more parallel bars, V, is arranged above, and rests upon the ordinary grain-receiver, as shown, or it may be in the form of a slotted concave, in which the grain discharged by the elevator is deposited, V′ representing the slot in which the bundling-arms Q move for gathering and compressing the grain.

The operation of these devices is as follows: Supposing a sufficient quantity of grain to be in the concave V to form a bundle, a half-revolution is imparted to the shaft O by the wheel P through the connections described, imparting a corresponding movement to the cross-head or bundling-arms Q. The grooved pulleys $q$ on the upper arm strikes against the cord $s$, and, pressing it before it, carries it over and behind the grain in the concave, down through the slot V′, and underneath the grain, until the arm Q′ comes close to the arm $r^1$, to which one end of said cord is attached, thereby forming a loop (see dotted lines at $s^1$) in the cord $s$, encircling, or nearly encircling, the bundle. When the arm Q or Q′ has reached this position the stops $o^4$ and $u$ $u'$ come into play, as described, and hold the arms Q and $r^1$ while another gavel accumulates behind the arm Q′, giving the operator ample time to apply the band.

During this operation, it will be seen the bundle is tightly compressed by the cord $s$, which is held under tension by the spring $t$, the bundle being thus completed by the time the wheel P has completed its half-revolution necessary to again connect it with the shaft O, as has been explained, when, by the farther movement of said shaft, the arm $r^1$ is released and the cord $s$ is retracted into its former right line, releasing the bundle, which is crowded outward by the following arm Q′, and descends over the chute K upon the dumping-carrier, when the operation is repeated, as before.

W W′ represent band-trays, for carrying either prepared bands or straw suitable for bands. These are provided with suitable lugs or ears $w$, adapting them to be readily attached to or disconnected from the table H or frames N, either or both, as preferred. Addi-

tional bands or straw therefor may be carried underneath the chute K and at the ends of the binders' platform and shattered grain-receptacle.

When the bundling attachment described is removed, the dumping-table may be raised to the plane of the tables H′, its usual position, and under its usual arrangement, if preferred.

The slats of the elevator-apron, to prevent them from lagging or being deflected backward in passing over the rollers, have little angular brace-straps *x*, connected to them at their ends, the feet of which rest upon the apron in rear of the slats, and so hold them up to their work; or, instead of these, if preferred, leather or other yielding straps may be made to hold the slats by being con-
753 nected therewith, and with the apron in advance of the slats.

Having now described my invention, what I claim as new, and desire to secure by letters patent, is—

1. The reel mounted in sliding boxes on the pivoted reel-bearers *b* $b^1$, in combination with the rock-shaft $e^2$, connecting-links $e^1$, and adjusting-levers *d* $e^3$, all arranged and operating as described.

2. The gear-plank, slotted or forked at its forward end, in combination with the tongue-straps, arranged to stride one of the arms of said gear-plank, as described.

3. The dumping bundle-carrier L, in combination with the inclined delivery-chute K, extending between the binders' grain-receiver and said carrier, and arranged in the described relation thereto, substantially as and for the purpose set forth.

4. The binders' carriage-frame, suspended from the main frame on a transverse pivot arranged at or near its upper edge, and adapted to be vibrated thereon by means of the rock-shaft and connecting-link *h*, arranged and operating substantially as described.

5. The rotating bundling-arm Q, in combination with the compressing-cord *s*, arranged and operating substantially as described.

6. The shaft of the bundling-arm Q, having the eccentric arrangement to its driving-wheel P, in combination with the arms or cross-head $o^1$ and actuating pin or tooth *p*, arranged and operating as described.

7. The bundling-arms Q and the vibrating arm $r^1$, to which the compressing cord or strap is connected, in combination with the stops $o^4$ and *u*′, for locking said arms in position while the gavel is being bound, substantially as described.

8. The combination, with the intermittingly-rotating shaft O and its gaveling-arms Q, of the cone-pulleys P, substantially as and for the purpose described.

9. The bundling attachment, consisting of the frame N $N^1$, with its bundling-shaft O, arm Q, and compressing devices, made removable as a whole, when desired, substantially as and for the purpose set forth.

In testimony whereof I have hereunto set my hand this 9th day of March, A. D. 1876. JOHN H. ELWARD.

Witnesses:

JOHN G. CENTER.

ALEXANDER MAHON.

756 UNITED STATES PATENT OFFICE.

WILLIAM F. OLIN, of Chicago, Illinois.

*Harvester.*

Specification forming part of Letters Patent No. 223,812, dated January 27, 1880. Application filed November 17, 1877.

To all whom it may concern:

Be it known that I, William F. Olin, of the city of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful improvements in harvesting-machines; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

(Here follow diagrams marked pp. 754 & 755.)

Fig. 1 is a front elevation; Fig. 2, a top or plan view; Fig. 3, a detail of the cover of the elevator; Fig. 4, a detail, in section, of the devices for elevating the butts of the grain; Fig. 5, a detail of the same parts; Fig. 6, a detail, showing the devices for shifting the butt-elevator.

In that class of harvesting-machines where the grain is received upon a carrier-platform and elevated over the drive-wheel by an elevator and deliverer to the binders or an automatic binder it is desirable that there shall be no stoppage in the flow of the grain in its passage to its place of delivery; that the butts of the grain shall be carried up parallel, or nearly so, with the heads of the grain, so as to deliver the grain in proper shape for binding purposes, and that the grain shall be delivered to the receiving-table so that it can be bound at or near the middle.

The object of this invention is to provide devices for attaining all of these results; and it consists in interposing a roller between the lower end of the elevator and the inner end of the grain-carrier, to facilitate elevating the grain and prevent clogging at that point, and prevent the grain from being carried down or falling through between the elevator and carrier; in providing a belt or chain at the grain side of the machine for elevating the butts of the grain, supported on a swinging bar, so that it can be adjusted, according to the length of grain being elevated, to deliver the grain so that it can be bound at the middle; in devices for operating and adjusting the elevator for the butts; in the peculiar construction of the cover; in arranging and operating the belt for the butts so that it prevents any clogging by short grain at the heel of the sickle; in arranging the device for elevating the butts so that it will bear against the butts of the grain and crowd or move the grain back on the ele-

2 Sheets—Sheet 2.

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Fig. 4.

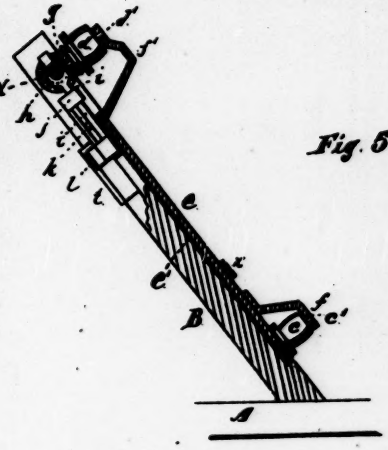
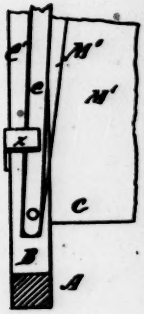


Fig. 5.



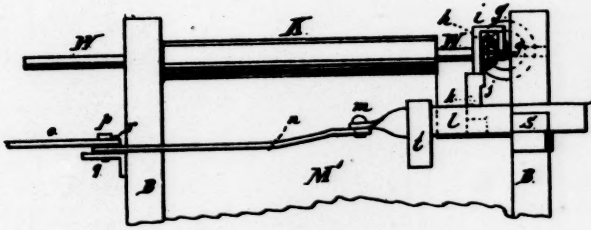


Fig. 6.

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2 Sheets—Sheet 1.

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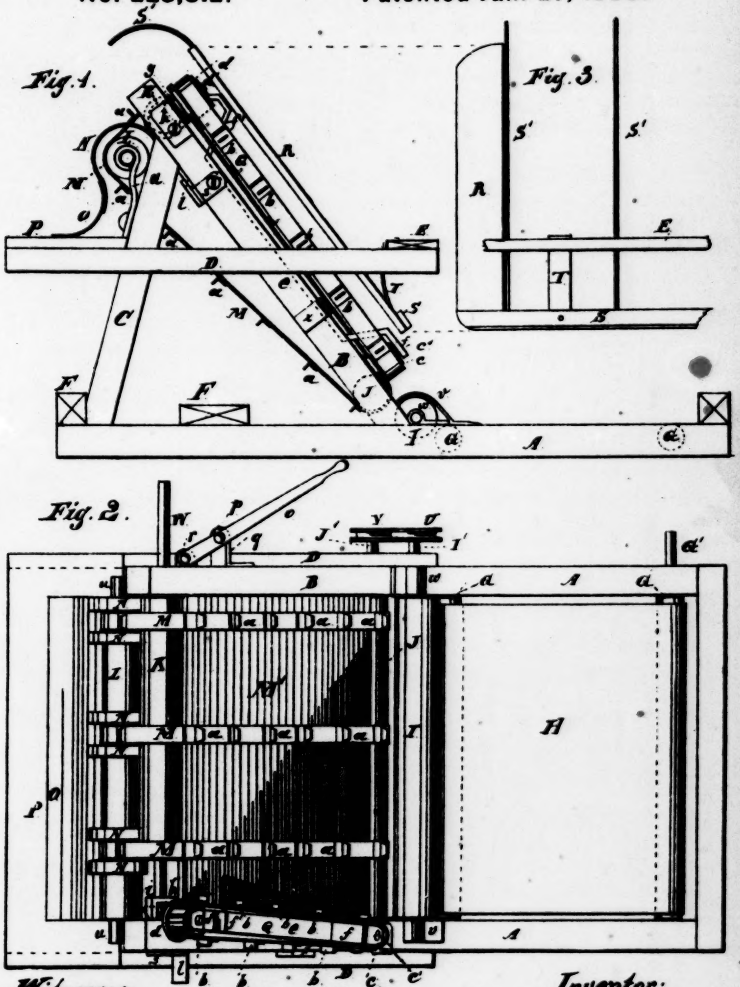


Witnesses:
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vator toward the center, for the purpose of straightening the grain in its passage up the elevator, and delivering it so that it can be clasped or bound near the middle, to facilitate the ease of binding; and in the several parts and combination of parts hereinafter described as new.

In the drawings, A represents the main frame; B C, the elevator-frame; D, the cross-pieces supporting the binder-table or platform or binder; E, the cross-piece secured to the cross-pieces D, and supporting the driver's seat; F, the cross-pieces between which the main or driving wheel (not shown) is located, and on which it is journaled in any suitable manner; G, the rollers for the carrier-platform; G′, the axles or shafts of said rollers; H, the carrier-platform; I, the interposed roller; I′, the shaft of the roller I; J, the lower elevator-roller; J′, the shaft of the roller J; K L, the upper elevator-rollers; M, the elevating-belts; M′, the backing-board; M″, the angular opening on the front edge of the backing-board; N, the strips of metal or fingers at the upper end of the elevator; O, the curved piece of metal supporting the fingers N; P, the platform on which the grain is delivered; Q, the belt for elevating the butts; R, the board portion of the cover; S, the cross-piece secured to the board R; S′, the spring-arms, forming the other portion of the cover; T, the springs connecting the piece S with the driver's platform; U V, the driving-pulleys; W, the shaft of the roller K; *a*, the teeth on the elevating-belts; *b*, the teeth on the butt-elevator belt; *c d*, the pulleys carrying the butt-elevator belt; *c′ d′*, the pulley-shafts; *e*, the pivoted connecting bar or strap, on which the butt-elevator pulleys are mounted; *f f′*, the caps for the pulleys *c d*; *g h*, the miter-wheels, giving motion to the butt-elevator; *i*, the sliding head or journal-support for the miter wheel *g*; *j*, the frame or guide in which the support *i* slides; *k*, the pin for holding the head *i* in place laterally; *l*, the sliding plate or bar; *m*, the pivot for the sliding plate *l* and bar *n*; *n*, the bar connecting the
757 sliding plate with the operating-lever; *o*, the lever; *p*, the pivot for the lever *o*; *q*, the bracket supporting the lever; *r*, the pivot at lower end of lever for connecting it to the rod or bar *n*; *s t*, the supports for the sliding bar *l*; *u*, the adjustable bearing for the lower of the upper rollers of the elevator; *v*, the curved plate at the foot of elevator over the front bearing of the roller I; *w*, journal-bearings of the roller I; *x*, the plate or catch for holding the bar *e* in place and preventing it from rising.

The parts A, B, C, D, E, F, G, G′, and H may be of any of the ordinary forms of construction, and the complete machine is to be provided with a drive-wheel, sickle, divider, grain-wheel, and suitable gearing for operating the several parts; but as these parts may be of any of the usual forms of construction, they are neither shown nor described.

The lower elevator-roller, J, is suitably journaled, near the lower end of the elevator, in the pieces B of the elevator-frame. Between this roller J and the inner roller of the carrier-platform is another roller, I, so located and arranged as to permit and aid the passage of the grain from the carrier-platform to the proper position to be

taken by the elevating belts or devices, and prevent the grain from falling through at that point. This roller, as shown, is journaled in suitable bearings *w*, secured to the main frame A, and its shaft I′ projects some distance beyond the rear of the frame, and is provided with a pulley, U, by means of which the roller is driven. The roller J is so arranged in relation to this interposed roller I that the teeth *a* of the elevating-belts M will just clear the roller I.

The shaft J′ of the roller J extends beyond the elevator-frame, and is provided with a pulley, V, for driving the roller J.

The elevating-belts M pass over the roller J at the bottom and over the rollers K L at the top of the elevator-frame. These belts M are provided with teeth or pins *a* for engaging with and elevating the grain, and by passing the belts over two rollers, K L, at the top, as shown, instead of one, a positive downward movement is given to the grain, which greatly facilitates its delivery upon the receiving-table or grain-receptacle.

The receiving-table P, as shown, is located on the cross-bars D, and to it is secured a curved piece of metal, O, so arranged as to prevent the grain on the table from falling back into the machine beneath the elevator. To this curved piece of metal O are secured springs or fingers N, so arranged and formed as to extend up and over the lower one of the upper elevator-rollers, L, the object of which fingers is to prevent the grain from going between the two upper rollers, and also to insure its delivery to the binder.

The butt-elevator belt is provided with suitable teeth *b*, and is located on top of the forward piece, B, of the elevator-frame, and is supported and driven by two pulleys, *c d*, which have their faces or sides parallel with the top of the piece B. These pulleys *c d* are connected together by the piece *e*. This piece *e* may be located in a groove, *e′*, formed in the piece B, which groove is of such form as to permit the piece *e* to move backward and forward, or may be located directly on top of the piece B. The shaft *c′* of the wheel *c* has its lower bearing in the piece B and its upper one in the cap or bent-up bar *f*, which bar or cap is permanently secured, as shown, to the bar or strap *e*. This shaft *c′* also forms a pivot for the bar or strap *e* to swing on. The upper bearing for the shaft *d′* of the pulley *d* is in the bent-up portion or cap *f′* of the strap *e*, and to the lower end of this shaft *d′* is secured a miter-wheel, *g*, which gears with a similar miter-wheel, *h*, secured to the shaft W of the roller K. On the shaft W, and sliding thereon, is a piece of metal, *i*, so formed as to have two arms parallel to each other and a connecting-piece. The arms of this piece *i* are located on the shaft W, and between them is the wheel *h*, so that this piece *i* is above and on each side of the wheel *h*, and forms a guard therefor, to prevent any grain from becoming entangled therein. In the outer arm of this sliding head *i* is the journal-bearing for the lower end of the shaft *d′* of the pulley or wheel *d* for the upper end of chain Q, so that as the head *i* is moved back and forth on the shaft the upper end of this belt Q must be carried with it, by reason of the journal-bearing for the shaft *d′* being in the sliding head.

By locating the wheel *h* between the arms of the sliding head and

journaling the wheel *g* thereto, as shown and described, it will be seen that the wheels *g h* must be in gear, no matter what the position of the upper end of Q may be.

The inner arm of the sliding head *i* extends some distance below the shaft W and enters a suitable guideway in the support or frame *j*. As shown, this arm passes between a pin, *k*, secured to *j* near its middle, and ears or projections formed on the edge of *j* at the top and bottom, so that this arm can slide up and down to some extent, but has no lateral play.

The guide or support *j* is permanently secured to the bar *l*, which bar moves forward and back in the bearings or guides *s t*, one of which, *s*, is secured to the piece B, and the other, *t*, to the backing M′ of the elevator. To the inner end of this bar *l* is pivoted, at *m*, a bar or rod, *n*, which extends across the elevator and projects some distance beyond the elevator-frame, and to its outer end is pivoted, at *r*, the lever *o*, which lever is supported on a bracket, *q*, attached to the piece B, and is held in place thereon by the pivot *p*.

The roller L is journaled in adjustable bearings *u*, secured to the pieces C of the elevator-frame, by means of which the belts M can be kept at the proper tension.

As shown, the forward bearing of the roller I is covered with a curved piece, *v*; but in practice this piece may be dispensed
758 with and the bearing so formed as to accomplish the same purpose of permitting the grain at that point to pass up so as to be reached by the teeth *b* of the belt Q.

The rollers G I J K L are to be driven by means of suitable belts and pulleys operated from the main or drive wheel.

It will be seen that as the lever *o* is moved to or from the driver it will carry the upper end of the elevator Q out or in, as desired, by reason of the connecting-rod *n*, sliding bar *l*, supporting frame or piece *j*, sliding head *i*, gear-wheels *g h*, and shaft *d*′, and as the upper end of the belt or elevator is carried in or out it will describe an arc of a circle, so that the pulley *d* will be carried up and down slightly, carrying with it the gear-wheel *g*. The sliding head *i* must, therefore, be so arranged and connected to the shaft W and the devices for sliding it that it will be self-adjustable, in order to allow the upper end of the elevator or belt Q to operate.

The cover for preventing the grain from being blown away as it is elevated consists of the board R and spring-arms S′. The board R is located over the belt or elevator Q, and is so arranged as to keep the butts of the grain down, so that the belt can elevate them and at the same time permit their easy passage up the backing-board M′. To the lower end of this board R is secured a cross-piece, S, which is connected and supported from the driver's platform by means of spring-arms T. This arrangement permits the cover or arms S′ to yield according to the amount of grain being elevated.

The backing-board M′ is secured to and between the posts or pieces B in any suitable manner, and is so arranged as to permit the easy passage of the grain, the grain in its passage being between this backing-board M′ and the cover R S′. The front edge of this backing-board M′ is provided with an angular recess, M″, formed

by cutting out a portion of its upper face, as shown in Figs. 2 and 5, so that the backing-board will not interfere with the swinging of the belt or elevator Q on its pivot.

The backing-board M′ might be so arranged as to dispense with the recess M″; but by using this recess M″ it permits the lower edge of the butt-elevator to come below the upper line of the backing-board, so as to insure its engagement with all the butts of the grain and prevent the grain from getting between the backing-board and butt-elevator.

The elevator or belt Q can be used with other forms of elevators than the one shown to accomplish the same results, the belt being so arranged in relation to such elevator as to run with its edge parallel with the upper face of the backing-board or elevator.

As shown, the frame or support for the elevator or belt Q is pivoted at the lower end of the elevator-frame and has its driving mechanism located at the upper end; but the driving mechanism may be located at the lower end of the belt Q or elevator, if desired.

As shown, the butt-elevator Q consists of a belt, Q, provided with suitable teeth *b*, operated by pulley-wheels; but a chain provided with teeth or not, operated by suitable sprocket-wheels at the upper and lower ends, might be used in place of the belt.

By arranging the pulleys *c d* so that their flat faces will be parallel with the top surface of the elevator-frame, the butt-elevator will be operated so that its face will strike against the end of the butts of the grain when elevating the butts; and by supporting the butt-elevator on a frame or support pivoted at it lower end and free to swing back and forth at its upper end, the elevator can be so adjusted as to cause the grain to be delivered at one point, no matter what the length may be, for as the butts are carried up by the elevator the grain will be forced back toward the middle of the elevator by reason of the belt or chain striking against the ends of the butts and forcing them back, so that by this arrangement of the butt-elevator it not only serves the purpose of elevating the grain, but also acts as means to cause the grain in its passage up the elevator to be carried back, so as to deliver it at one point, regardless of its length, the upper end of the butt-elevator being carried in or out as the grain is short or long.

For delivering long grain in proper position for binding purposes the belt or elevator Q is to be so arranged that its upper end will be over, or nearly over, the piece B, in which position the elevator will operate on a line with, or nearly with, the front of the backing M′, and the grain will be carried up thereby, so as to deliver it at a point where it can be clasped and bound at or near the middle.

For delivering medium grain the upper end of the elevator Q is to be carried or swung over the backing or elevator the required distance, and then, as the grain is carried up the elevator, the action of the face of the elevator or belt striking the ends of the butts will force the grain back, as it ascends, toward the middle of the backing or elevator; and this carrying or forcing endwise of the grain will continue until it has reached the top of the elevator Q, when it is in proper position to be delivered at the same point as

the long grain, so that it can be clasped or bound near or at the middle.

For delivering short grain the upper end of the elevator Q is carried still farther over the backing or elevator for the grain, which makes the angle at which it stands greater, and forces the grain, as it ascends, still farther back on the backing or elevator by the action of belt or elevator Q on the ends of the butts, so that short grain will be carried up the elevator and delivered at the same point as before, so that it can be clasped or bound at or near the middle.

The upper end of the elevator Q is shifted to bring it to the desired position to deliver long, medium, or short grain by the
759 operator, who takes hold of the lever *o* and moves it toward or from the elevator-frame. As the upper end of the lever is moved away from the frame its lower end will be carried in, and, carrying with it the rod *n*, will slide the plate or bar *l* forward, carrying with it the support or frame *j*, with which the sliding head *i* is connected, which head will be moved forward on the shaft W, carrying with it the gears *g h*, and, through the shaft *d'*, the upper end of the elevator Q, bringing the parts into the position shown in Fig. 2.

When the upper end of the lever *o* is carried toward the driver its lower end is carried out, carrying with it the rod *n* and sliding bar or plate *l* and frame or support *j*, which moves the sliding head *i* back on the shaft W, and with it the gears *g h*, and, through the shaft *d'*, carries the upper end of the elevator Q over the backing or elevator to any desired position to deliver the grain at a point where it can be clasped or bound at or near the middle.

By this arrangement the grain as it is being elevated will be carried back or endwise, so that the middle of the grain will always come to the same point, no matter what the length of the grain may be, and so that it will be delivered in such a position that a binder who stands at a given place or point can clasp the sheaf in the middle and bind it without the necessity of shifting his position to accommodate himself to the delivery of the grain, and by thus delivering all lengths of grain at a uniform point the ease with which it is bound is greatly facilitated; and in case an automatic or self binder is used, it can be arranged stationary at the point to bind the grain properly, and the grain will be carried up and delivered at that point, so as to enable it to be bound by the self-binder at or near the middle, so that all devices which are now used for the purpose of adjusting a self-binder to the position to enable it to bind the grain properly are dispensed with, as the grain, whether long or short, will be delivered at the same point by shifting the upper end of the butt-elevator, as before described.

By this arrangement all the devices for effecting a fore-and-aft adjustment for binding purposes are dispensed with, and the same means employed for elevating the butts also afford the means for properly delivering the grain, and such delivery is effected during the transit of the grain up the elevator.

The elevator Q need not extend the entire length of the elevator, but may stop some distance below the upper elevator-roller, as the

grain, after it is once forced to the proper point on the elevator, will be carried up and delivered in that condition.

In operation, the grain, as it falls upon the carrier-platform H, is carried forward to the roller I, which also being in motion carries the grain up over it, when it is received by the teeth *a* of the elevator-belts, and by the belts M carried up and delivered to the receiving platform or table.

As machines have been heretofore constructed the grain as it passes to the foot of the elevator was liable to stop and accumulate at that point, which prevented the easy elevation of the grain. By interposing the roller I between the foot of the elevator and the end of the carrier, as shown, it will be seen that no grain can accumulate at that point, as the roller I will move it forward and over the roller under all circumstances, thus keeping the grain constantly in motion at the foot of the elevator, so that it cannot become tangled or accumulate and clog the elevator, and this roller I by reason of its revolving will also tend, to some extent, to straighten the grain before it is elevated, and it also prevents any grain from falling through at this point. This roller I is so located as not to interfere with the transit of the grain to the elevator from the carrier, and operates in such a manner as to facilitate such transit.

The butts of grain are heavier than the heads, and consequently lag behind unless some means are provided to make them move faster than the heads. In order to elevate the butts even with the heads, the belt or elevator Q is so arranged that the teeth *b* will engage with the butts of the grain on the roller I and carry them up while the heads are being carried up by the elevator-belts M. The lower pulley, *c*, is to be so arranged that it will permit the teeth *b* or the elevator Q to clear the end of the roller and engage the butts, and this pulley *c* is located as close to the main frame as is possible and permit the operation of the butt-elevator, which location of the pulley brings the butt-elevator in position to enable it to catch any short grain, which short grain is liable to fall down and be caught by the heel of the sickle and clog the sickle. By locating the lower pulley, *c*, of the belt Q at the proper distance above the main frame A, the teeth *b* on the elevator will come in contact with such short grain and force it forward onto the carrier-platform, thus keeping the heel of the sickle clear at this point.

As shown in the drawings, in Fig. 2, the belt or chain Q is in position for elevating long grain and delivering it at the proper point for binding, in which position the lever *o* is carried away from the elevator. For elevating short grain and delivering it at the proper point, the operator takes hold of the lever *o* and pulls it toward the elevator frame, which carries the upper end of the belt or chain Q over the elevator to the proper point for elevating short grain.

What I claim as new, and desire to secure by letters patent, is—

1. In combination with a harvester elevator, a swinging elevator pivoted at its lower end and suitable devices for shifting its upper end, whereby the swinging elevator forms a means for ele-

vating the butts of the grain and delivering grain of different lengths at the same point, substantially as specified.

2. The adjustable elevator or belt Q, having its pulleys or wheels arranged with their faces parallel with the upper surface of the main elevator, in combination with such main elevator for carrying the butts up even with the heads, substantially as specified.

3. The adjustable elevator or belt Q, having its lower end, *c*, advanced in front of the line of grain travel, and arranged as described in relation to the main elevator, substantially as and for the purposes set forth.

4. The pivoted frame or bar *e*, supporting the elevator Q, in combination with the sliding bar *l*, rod *n*, and lever *o*, for adjusting the upper end of the belt, substantially as and for the purpose specified.

5. The shaft W, wheel *h*, and frame *i*, in combination with the gear-wheel *g* and pulley-wheel *d*, for driving the elevator and keeping the gear-wheels *g h* in gear, substantially as specified.

6. The elevator or belt Q, in combination with the inclined board R and main elevator, substantially as and for the purpose set forth.

In testimony that I claim the foregoing as my own I hereto affix my signature in presence of two witnesses.

WILLIAM F. OLIN.

Witnesses:

WILLIAM H. CALHOUN.

MERRITT GREENE, JR.

762 UNITED STATES PATENT OFFICE.

WILLIAM MCGREGOR and THEODORE M. FLENNIKEN, of Rockford, Ill.; said McGregor, for himself and as administrator of said Flenniken, deceased, assignor to William Lathrop, of same place.

*Grain-adjusting Mechanism for Grain-binding Harvesters.*

Specification forming part of Letters Patent No. 323,187, dated July 28, 1885; application filed May 12, 1879.

To all whom it may concern:

Be it known that we, William McGregor and Theodore M. Flenniken, of the city of Rockford, in the county of Winnebago and State of Illinois, have invented certain new and useful improvements in grain-adjusting mechanism for grain-binding harvesters, of which the following is a specification:

This invention relates to that class of machines known as "automatic binding-machines," designed for use in connection with harvesting-machines, to automatically bind the grain as it is cut by the harvester.

The object of this invention is to deliver the cut grain in its passage from the harvester centrally to the binding-machine, so that it may be automatically bound practically in the center of its length whether the grain is long or short in the straw. To this end we have designed and constructed the machine represented in the accompanying drawings, in which—

(Here follows diagram marked p. 761.)

Figure 1 is an isometrical representation of a machine embodying our invention. Figs. 2 and 3 represent the toothed-gear connection to impart motion to the endless-belt guides employed to deliver the grain centrally to the binding devices.

Only such parts of a complete machine are shown as are necessary to represent our invention. Other portions required to produce a complete machine may be any of the known devices employed in any known form for like purposes, and hence are neither shown nor described in this application.

In the figures, A represents a portion of the main frame of a harvester, on which is mounted a frame capable of use as the frame of a binding-machine. This frame is mainly composed of corner-posts B, sills C, lengthwise beams D, and the necessary intermediate parts, framed or otherwise firmly connected to produce a rigid frame. In this frame E are inclined end beams fixed to the corner-posts, and in connection with lengthwise side beams immediately connected therewith serve to support the inclined binding-table F, which receives the cut grain delivered from the harvester, and on which it descends to the binding devices properly located in or near the binding-table. In this arrangement it will be seen that a binding

W. McGREGOR & T. M. FLENNIKEN.

GRAIN ADJUSTING MECHANISM FOR GRAIN BINDING HARVESTERS

No. 323,187. Patented July 28, 1885.

No. 322: Deering v. W. H. W. et al } p. 761

Fig. 1

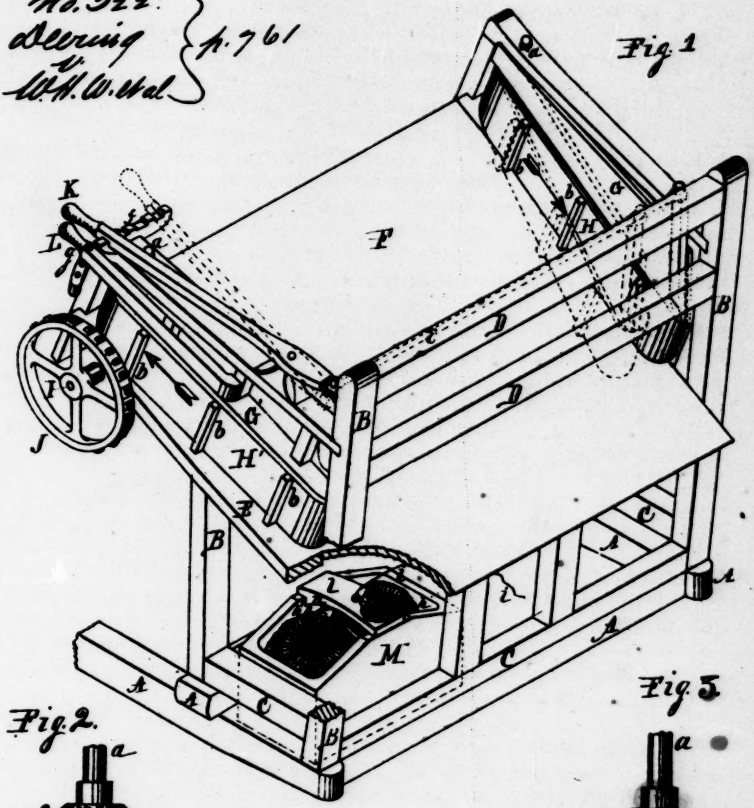



Fig. 2.

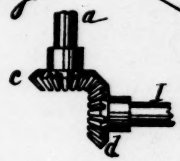



Fig. 3.

Witnesses.
F. J. Sovereign.
A. O. Behel.

Inventors,
William McGregor
Theodore M. Flenniken
Per Jacob Behel
Atty.

mechanism fixed in such relative position with the binding-table that grain having straw of medium length descending the inclined table to the binder would be bound at its proper center, would if the straw were long bind it too near the stubble end, and if the straw were short would bind it too near the heads.

In our improved machine, which forms the subject-matter of this application, we have employed the swinging end frames represented at G G′, which are pivoted near the upper inner corners of the binding table, and at right angles to the plane thereof, on pivot-journals *a*, supported in suitable frame-work in such a manner that the lower ends of the frames will be free to swing over the table. These frames are provided at their pivoted ends with suitable rollers fixed on the pivot-shaft *a*, to revolve therewith. The free end of each of these swinging end frames is also provided with a roller fitted to revolve in the frame on suitable journals.

H H′ are endless belts or aprons mounted on the end rollers of the swinging frames, which aprons, when motion is imparted to the pivot-shafts *a*, will be made to travel in the direction of the arrows.

*b* are slats or battens fixed to the endless belts crosswise thereof at proper intervals, and are employed to increase their carrying capacity. The lower ends of the pivotal shafts *a* of the rollers are fitted with miter-gear wheels *c*, the teeth of which engage the teeth of like wheels *d*, mounted on the horizontal driving-shaft I; placed under the upper portions of the binding-table, and fitted to revolve in suitable bearings fixed to the main frame.

J represents a sprocket-wheel mounted on the projecting end of the driving-shaft, and designed to connect with the harvester by means of a chain, belt, or other suitable means.

K represents a lever pivoted to the upper end bar of the frame, and having its handle located within easy reach of the attendant. Its outer end is connected with the swinging end frame, G, by means of a rod, *e*, in such a manner that the movements of the hand-lever will cause the swinging frame to move forward or back on the binding-table.

763 *f* represents a bar notched to receive the lever, and fixed to the frame near the handle of the lever in such a manner as to hold the swinging frame in its adjusted position.

In use the grain from the harvester will be delivered on the binding-table with its stubble end near the swinging frame G, and if long in the straw will descend the table to the binder without endwise movement, and the moving belt on the swinging frame will engage its stubble end and insure its passage to the binder. When the straw is short, the swinging end frame is moved back on the table, as represented in dotted lines. The stubble end of the grain will be engaged by the moving apron, and in its descent over the table the grain will be shifted endwise thereon, and thus presented centrally to the binder. In this operation the inclination to the swinging frame will be varied according to the length of straw, and its inclination will control the central delivery of the grain to the binder.

By means of this device we are enabled to deliver the cut grain centrally to the binder, whether the straw is long or short.

The swinging end frame, G′, is useful, mainly, when the straw is long, to insure the passage of the head ends to the binder or through the frame, and lessen the waste of grain in shelling. The angle of this end frame can be varied by means of the lever L, and fixed, when adjusted, by means of the retaining-pin *g*.

At M we have represented a box as a convenient means of carrying an immediate supply of binding material, and at *h* and *h′* have represented balls of twine placed therein to be used for binding the grain.

We claim as our invention—

1. An endless belt moving in the direction of the grain-delivery, operating when in contact with the heads of the grain on its passage from the elevators to insure their passage over the table, substantially as and for the purpose set forth.

2. The combination, with an inclined table, the shaft I, pinions *d*, pinions *c*, shafts *a*, and rollers and belt-carrying frames secured to the said shafts *a*, of the endless belts moving in the direction of the grain-delivery, one of the said belts operating when in contact with the heads of the grain on its passage from the elevators to insure their passage over the table, and the other operating on the stubble ends of the grain, substantially as set forth.

3. The combination, with the shaft I, pinions *d*, pinions *c*, an shafts *a*, of belt-carrying frames secured to the shafts *a*, endless belts mounted in said frames and provided with slats, and levers for adjusting the belt-frames independent of each other, substantially as set forth.

WILLIAM McGREGOR.
THEODORE M. FLENNIKEN.

Witnesses:
A. M. WADDELL.
A. O. BEHEL.

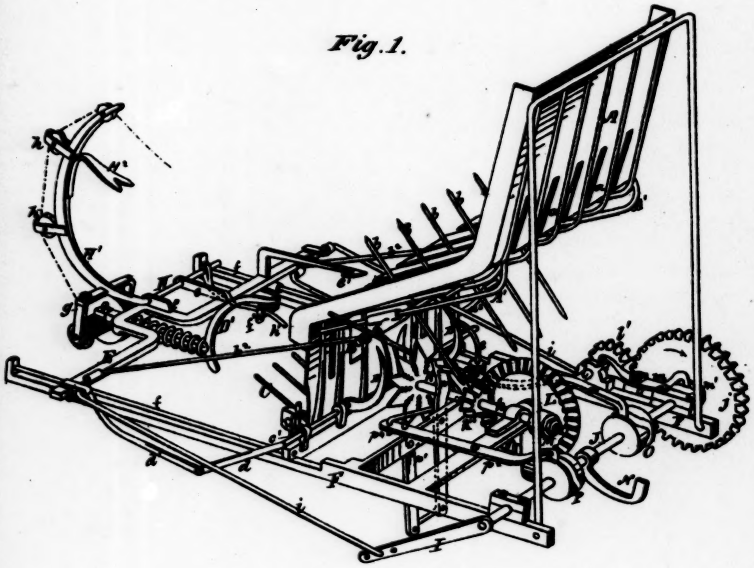
2 Sheets—Sheet 1.

J. E. BUXTON.

GRAIN-BINDER.

No. 178,993. Patented June 20, 1876.

Fig. 1.



No. 322.
Deering
v.
W. H. W. et al
p. 764

Attest:
P. McNickle
W. E. Chaffee

Inventor:
John E. Buxton.
per, L. Deane
Atty

2 Sheets—Sheet 2.

J. E. BUXTON.

GRAIN-BINDER.

No. 178,993. Patented June 20, 1876.

No 322
Deering
v
W. H. W. et al
p 765

Fig. 2.

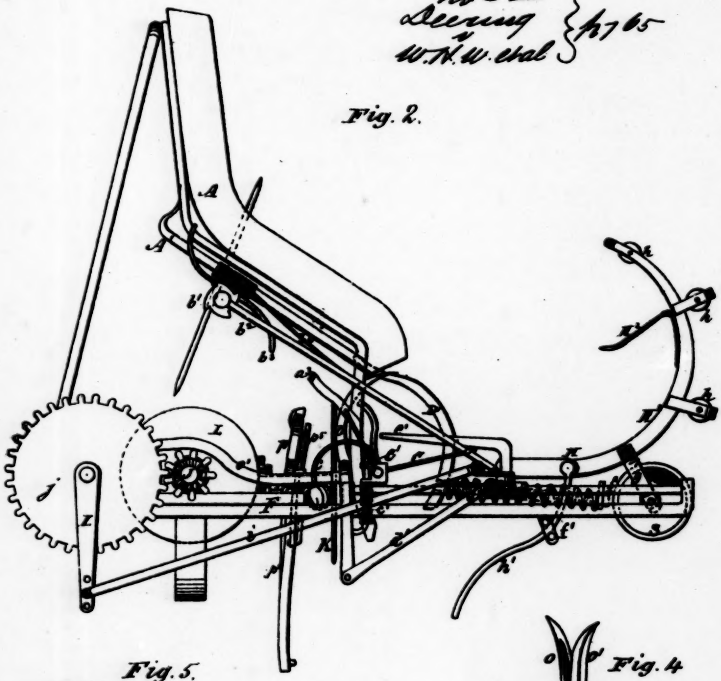


Fig. 5.

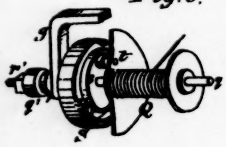


Fig. 4

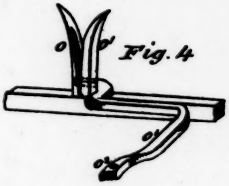
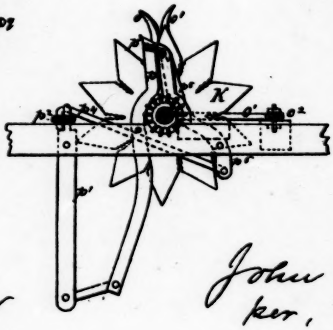


Fig. 3.



Attest:
P. McNickle
W. E. Chaffee

Inventor.
John E. Buxton.
per, L. Drauer.
Atty

766 UNITED STATES PATENT OFFICE.

JOHN E. BUXTON, of Owatonna, Minnesota.

*Improvement in Grain-binders.*

Specification forming part of Letters Patent No. 178,993, dated June 20, 1876; application filed April 24, 1876.

To all whom it may concern:

Be it known that I, John E. Buxton, of Owatonna, in the county of Steele and State of Minnesota, have invented certain new and useful improvements in grain-binders, of which the following is a specification:

Figure 1 represents, in perspective, my grain-binding machine. Fig. 2 represents a side elevation of the same. Fig. 3 represents a transverse section, showing the pinchers and the twisting-wheel. Fig. 4 represents, in perspective, the griping device that holds the binding-wire while being twisted. Fig. 5 represents, in perspective, the reel partly broken away to exhibit the take-up spring attached to it.

My invention relates to that class of grain-binding machines in which wire is used to bind the grain, and is to be employed in connection with harvesters in which the cut grain is received on an endless apron, and elevated by means of canvas or belts, or any other suitable device, above the driving-wheel of the harvester, and comes down on the opposite side in a continuous stream.

My invention relates, also, to certain combinations of a reciprocating and revolving cut-off, to arrest at times the grain descending continuously, and a slatted platform to receive it and hold it in proper position to be bound. It relates, also, to a wire-twisting mechanism, in connection with nippers and a griping device, by means of which the grain-bundles are securely bound after having been held and compressed by my improved mechanism.

In the drawings,

(Here follow diagrams marked pp. 764 & 765.)

A represents an inclined slide, upon which the grain is received in a continuous stream, after having been elevated over the driving-wheel of that class of harvesters in which elevated aprons or belts are used. In this slide A a series of slots, *a*, are cut, through which the teeth *b* of a rake can project upward at stated times and arrest the grain in its descent. The teeth *b* are attached to a bar, B, having an intermittent rotating and also a sliding motion back and forth upon guides A′, attached to the frame of the slide A. When the teeth *b* of the cut-off are out of the way of the falling grain, the latter will descend upon a slatted platform, C, that is held in position to receive the grain by means of a counterpoised weight, *c*. The platform C is supported by springs *c*′ at each end, to relieve the

bundle of grain from too great a pressure when the bent arms D come down upon the bundle to compress it, in conjunction with the spring-compressor D′, that is carried back and forth by a reciprocating frame, E, sliding upon guide-rods *f*, attached to the main frame F of this machine. This reciprocating frame E carries, in suitable bearings, *e*, a rock-shaft, H, to the end of which the crescent wire-carrier, H$^1$ is attached. Upon this carrier is located a frame, *g*, that carries the reel and the pulleys *h*, used as guides for the binding-wire while it is brought from the reel to the nippers.

The reciprocating frame E is moved back and forth by means of two connecting-rods, *i*, united to two crank-arms, I, attached to the main driving-shaft J. The rock-shaft H and with it the crescent wire-carrier H$^1$ are made to perform a semi-revolution by the action of the curved rod *h′*, attached to one end of the rock-shaft H, passing through a-loop, *f′*, pivoted to the main frame, the rod *h′* being curved in such a manner as to give the wire-carrier the desired motion to bring the wire around the bundle of grain to the nippers and to the wheel that is to twist it, while the carrier is brought to the bundle of grain by the crank-arms I and connecting-rods *i*. When the wire band has been placed around the grain, and the ends are twisted, the sheaf is discharged by depressing or partly rotating the slatted platform C, by means of a hook, *c′*, upon the reciprocating frame E, engaging with a rod, C′, attached to one end of the pivoted shaft of the slatted platform C, while the frame E accomplishes its backward movement, and then the rod C′ is released, and the counterpoise-weight *c* returns the platform C to its normal position.

The ends of the wire that form the bands are twisted together by means of a star-shaped wheel, K, mounted upon a shaft, *k*. This shaft carries a pinion, *k′*, that meshes with a bevel-gear wheel, L, attached to a shaft, *l*, parallel to the main driving-shaft J. The shaft *l* if rotated periodically, so that the twisting-wheel K can operate upon the ends of the binding-wire at the proper moment by means of a pinion, *l′*, that can be moved in and out
767 of gear with the gear-wheel *j*, on the shaft J, by a clutch-lever, *m*, operated by a cam, *m′*. The star-shaped twisting-wheel K is represented rather large in proportion to the other devices in the drawing, so as to show the serrations formed upon it to retain the ends of the wire with certainty while they are twisted together in a secure manner. During that operation the wire band is held next to the sheaf by a griping device formed of two jaws, *o* and *o*$^1$, the jaw *o* being stationary, while the jaw *o*$^1$ is pivoted to the frame *o*$^2$, and is operated, at the right time, by the cam O. The pinchers *p*, that cut the wire and retain one end of it fast between them, are located on the opposite side of the twisting-wheel K, and are operated by a series of levers, *p*$^1$ *p*$^2$, and link *p*$^4$, through a cam, P, mounted upon the main shaft J.

To provide against both ends of the wire band entering the same depression in the star-wheel K, I revolve it one-half of a revolution, (after one end has been engaged in one of the depressions,) by means of an arm, N, attached to the main shaft, striking against

the periphery of an India-rubber pulley, M, attached to the shaft of the twisting-wheel K.

The revolving rake *b* is operated by rods $b^2$, pivoted to its shaft B and to the frame E, and it is revolved, while the slatted platform C is free to receive the grain, by means of bent arms $b^3$, attached to its shaft B, striking against a stop, $a^3$, attached to the frame of the machine, and it is held from turning backward by means of a ratchet-wheel, $b^1$, with which the spring-pawl $b^4$ engages.

To regulate the tension upon the binding-wire, and produce a take-up mechanism for the slack wire, I have mounted the reel Q loosely upon a shaft, *q*, passing through bearings in the frame *g*. This shaft *q* is kept from rotating too freely by a check-spring, *q'*, of India-rubber or other suitable material, pressing against a washer, *r*, resting against the frame *g*, the required pressure being produced by a nut, *r'*, mounted upon the screw-threaded end of the shaft *q*. Upon this shaft *q* is attached a drum, S, containing a flat coiled spring, *s*. One end of this spring is attached to the drum at *s'*, while the other end is free, and is bent in the form of a loop to receive a pin, *t*, attached to the reel. Thus, when the binding-wire is drawn upon, it first winds up the spring *s* until it overcomes the tension of the spring *q'*, and the shaft *q* is permitted to revolve, and unwind the amount of wire required to make a band, and any surplus wire is taken up and wound back upon the reel by the spring *s* acting upon the pin *t*, attached to the reel.

The tension upon the compressor D' can be regulated by means of washers between its spring and the frame.

To bind grain with this machine, motion is transmitted from the harvester to the main driving-shaft J, the binding-wire having been passed from the reel Q over the guide-pulleys *h*, and through one of the indentations of the star-wheel K, to the pinchers *p*. The reciprocating frame E advances toward the grain-bundle that has been received upon the wire and slatted platform C, where it is compressed by the bent arms D and the spring-compressor D', the arms D being operated by a crank-arm, *d*, and the connecting-rod *d'* attached to the reciprocating frame E. Then the star-wheel K is turned half a revolution by the arm N striking against the elastic pulley M, and the crescent wire-carrier, continuing to advance and revolve, carries the wire around the bundle of grain, through an indentation of the star-wheel or twister K, to the pinchers, passing it under a hook, $p^3$, upon one of the jaws. Then the pinchers close upon the wire, which is then cut by the sharp edges formed on the fore part of the pinchers, which can also be called "nippers." Then the griping-jaws *o* $o^1$ close upon the two ends of the wire adjacent to the bundles of grain, and retain them while the twisting-wheel K revolves, and fasten the two ends of the wire by twisting them together. To bring the wire down between the griping jaws, the wire-carrier $H^1$ is provided with a forked arm, $H^2$, that carries the wire in the desired position to be retained by the griping-jaws. Adjacent to the cutting-edge of the nippers there is a vibrating finger, $p^5$, operated by the lever $p^2$, through the link $p^4$, to lift the end of the wire from the pinchers, so as to have it out

of the way when the new wire is brought to the pinchers. After the sheaf has been bound, the main shaft J continuing to revolve, the reciprocating frame E recedes from it, carrying with it the wire-carrier H, and unwinding the wire from the reel, one end of the wire being retained by the pinchers $p$, so as to obtain a length necessary for a band. During this retrocession of the frame E the hook $e'$, located upon said frame, engages with the rod C′ attached to the end of the platform C that supports the sheaf, and discharges the latter. The platform C is then returned to its normal position by the balance-weight $c$. During these operations the teeth $b$ of the cut-off have remained in a nearly-vertical position, so as to arrest the grain falling in a continuous stream upon the inclined platform or slide A, although having a sliding motion back and forth upon the guide-rods A′, but when the frame E and wire-carrier $H^1$ have receded far enough to clear the platform C, one of the bent arms, $b^3$, striking against the stop $a^3$, partly revolves the cut-off, so as to bring the teeth $b$ under the inclined platform A and allow the grain to slide down upon the binding-wire and slatted platform C, and the above-described operations are repeated.

Having thus fully described my invention, what I claim is—

1. In combination with an inclined slotted platform, A, located under the delivery end of a harvester using aprons or belts to elevate the cut grain, and a reciprocating frame, E, having a
768 wire-carrier, $H^1$, the reciprocating and revolving cut-off operating intermittently, substantially as and for the purposes described.

2. The combination of the twister-pinion, the rubber pulley, and the arm or knocker on the rotating shaft for operating the pinion intermittenly, substantially as set forth.

3. In combination with a griping device to hold the wire and nippers to cut it, the twisting-wheel K, constructed with indentations and serrations to receive the wire and hold it while it is twisted, substantially as set forth.

4. The twister-wheel K, provided with indentations and serrations, as described, and adapted to operate substantially as set forth.

5. In combination with a reciprocating frame carrying a hook, $e'$, to engage with an arm, C, attached to a platform for receiving and supporting the grain while it is bound, the pivoted and balance platform C, operated substantially as described.

6. In combination with a reciprocating frame and a wire-carrier, operated substantially as described, the nippers $p$, having hook $p^3$, upon one jaw, to receive the binding-wire and hold it, substantially in the manner and for the purposes set forth.

7. In combination with platform C, supported by springs $c'$, the vibrating bent arms D and spring-compressor D′, operated by reciprocating frame E, substantially as and for the purposes set forth.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

JOHN E. BUXTON.

Witnesses:
W. H. SHOEMAKER.
T. L. SLODE.

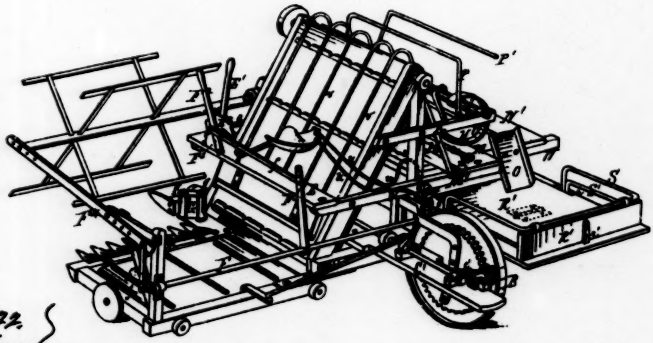
2 Sheets--Sheet 1.

J. H. ELWARD.
Harvester.

No. 165,316.

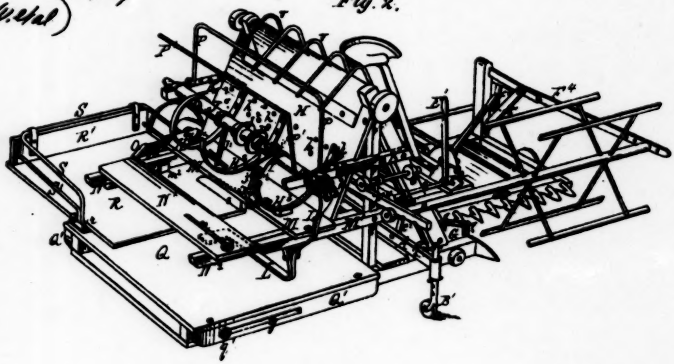
Patented July 6, 1875.

Fig. 1.



No. 322.
Deering
W. H. W. et al
N. 769

Fig. 2.



Witnesses:
Alex Mahon
John G. Center.

Inventor:
John H. Elward
by A. M. Knetts
Attorney

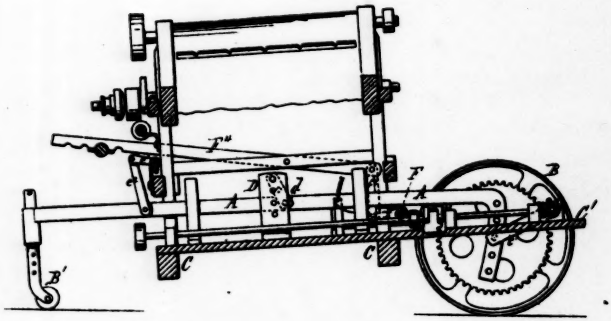
2 Sheets--Sheet 2.

# J. H. ELWARD.

## Harvester.

No. 165,316. Patented July 6, 1875.

*Fig. 3.*




No. 322. Deering & H. H. Ward } h. 770

*Fig. 4.*

*Fig. 5.*

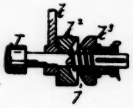
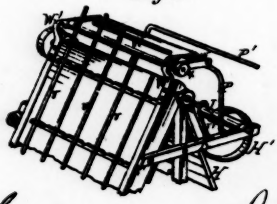



*Fig. 6.*




Witnesses:
Alex Mahon
John G. Center.

Inventor:
John H. Elward
by A. M. Smith
Attorney

771 UNITED STATES PATENT OFFICE.

JOHN H. ELWARD, of St. Paul, Minnesota.

*Improvement in Harvesters.*

Specification forming part of Letters Patent No. 165,316, dated July 6, 1875; application filed March 26, 1875.

To all whom it may concern:

Be it known that I, John H. Elward, of St. Paul, county of Ramsey, State of Minnesota, have invented a new and useful improvement in harvesting-machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing making part of this specification, in which—

Figure 1 is a perspective view of my improved machine, taken from the rear grain-side corner. Fig. 2 is a similar view, taken from the front stubble-side corner. Fig. 3 is a vertical longitudinal section, showing the truck bar or frame and the devices for suspending the harvester-frame therefrom, and Figs. 4, 5, and 6 represent details hereinafter described.

Similar letters of reference, wherever used, represent the same parts.

The invention relates, first, to the manner of suspending the harvester-frame upon the truck bar or frame, and to the devices for effecting the adjustment of the same; second, to the means for effecting the adjustment of the reel; third, to a novel means for moving the grain well back at the heel or delivery end of the platform, prior to its delivery to the elevator; fourth, to the construction and arrangement of the adjustable grain-receiving fingers, and to the bundle compressing and discharging devices, operating in connection therewith; fifth, to the manner of adjusting the binder's platform and seat or band table; sixth, to the means for controlling the dumping-tray; and, lastly, to certain details of construction and arrangement hereinafter fully set forth.

(Here follow diagrams marked pp. 769 & 770.)

In the accompanying drawings, A represents a truck bar or frame, which may be of any suitable form and construction, and which passes through the space underneath the elevator ordinarily occupied by the drive-wheel in this class of machines. This bar or frame is supported at one end by the drive-wheel B, and at its opposite end by an adjustable caster-wheel, B′, or truck, as preferred, by means of which the height of said end of the bar may be adjusted. The drive wheel end of this bar or frame is open or forked, (see Fig. 1,) and is provided upon opposite sides of the drive-wheel with grooved or perforated segments, in which the drive-wheel axle is mounted, and by means of which the height of said end of the bar or frame A may be adjusted as desired. C represents the harvester-frame

proper—that is to say, the frame carrying the cutting apparatus, the raking and elevating mechanism, and the binder's grain receptacle, stand, &c., and which may be of any usual or preferred form and construction for that purpose. Upon this frame is a double or an inverted U-shaped standard, D, which strides the bar A, to which the standard is connected by a swinging link or block, *d*, pivoted at one end to the truck bar or frame A, and at the other to the frame C, and serving to suspend the frame C from the truck bar or frame, the location of the standard or point of suspension D being near the center of gravity of the frame C and its attachment, with a slight preponderance in front and at the grain-side for keeping the cutters properly down to their work, while at the same time permitting the ready tilting of said frame for raising or depressing the cutters. The link *d*, provides for a relative longitudinal vibration of the frame A and C, and the standards D and link *d*, are both provided with a series of perforations, adapting them to be adjusted relatively to each other for suspending the frame C at different heights. An extension, C′, of the frame C, or of the gear-plank, accommodates the bearing of the pinion or bevel-wheel shaft *c*, and a link, *c*′, pivoted at one end on and vibrating around the main drive-wheel axle, and at the other upon the pinion-shaft, serves to hold the drive-wheel and pinions always in proper working relation while permitting the relative longitudinal vibration of the frames A and C referred to.

The seat-plank E, which is located over the elevating mechanism on the usual overhanging transverse bars, has connected with it, within convenient reach of the driver in his seat, a lever, $E^1$, attached to one end of a rock-shaft, *e*, mounted in suitable bearings on the elevator-frame, and provided at its opposite end with a crank-arm, $e^1$, which is connected by a link, $e^2$, with the truck bar or frame A. By vibrating the lever $E^1$ backward or forward the frame C may be rocked on its standard D for raising or depressing the cutters, as desired, and a rack, $E^2$, serves to hold the lever $E^1$ at
772 any desired point of adjustment. At the rear of the main and platform frames, in suitable bearings, is mounted a horizontal rock-shaft, F, operated by a vertical arm or lever, $F^1$, connected at its upper end by a link, *f*, with a lever, $F^2$, pivoted upon the seat-plank within convenient reach of the driver, and held at the desired adjustment by a rack, $F^3$. The ends of the shaft F are provided with crank-arms $f^1$, connected, by links $f^2$, with the rear ends of the pivoted reel-bearers $F^4$, and by the adjustment of these cranks, by means of the lever $F^2$ through the connecting devices described, the height of the reel can be readily adjusted by the attendant while the machine is in operation for adapting it to the condition of the grain. Upon the inner shoe, which, together with the elevator, is extended some distance in front of the bar to which the cutters are attached, I place two vertical pins or shafts, upon which are placed rollers *g g*, carrying a short endless apron, G, set obliquely to the line of the cut with the rear end or roller nearest the elevator. This apron may be operated either by the friction of the passing butts of the grain, or it may be given a positive movement by gears or belt and pulleys from any convenient driving-

shaft, the movement of the apron in either case serving to move backward the butts of the grain projecting over the finger-bar. In some cases a single enlarged roller, rotating backward and inward toward the elevator, will be found to answer the purpose efficiently.

The platform and elevator frames, and the raking and elevating mechanism connected therewith, may be of any usual or preferred constructions.

The inclined delivery-board H, down which the grain slides after it is discharged by the elevator, is provided with several series of perforations at *h*, (or it may be longitudinal slots,) adapting it to have a number of receiving-hooks or curved arms, $H^1$ $H^2$ $H^3$, attached to it, and to permit their adjustment forward and backward, according to the length of the straw.

Where these arms are designed for receiving the grain only, to be removed by hand, they will all be made in the concave or semicircular form represented by $H^2$; but where it is desired to have the bundle compressed and removed automatically, the rear and front arms will be constructed as follows, namely: the rear arm or hook $H^1$ has its outer end extended in a curved line, and is carried upward around, and is supported by, the rotating compressor-shaft J, closely clasping, but permitting the rotation of, said shaft. The forward arm $H^3$ extends to about the same distance as $H^2$, and there has a curved extension, I, hinged to it, (see Fig. 4,) the swinging end of said extension reaching upward to, and partially grasping, the shaft J.

The extension I at its hinged end is provided with a forked spur, *i*, and when the arms $H^1$ $H^2$ $H^3$ are receiving the grain a spring, I′, fastened to the arm $H^3$, drops in behind said spur, and locks it firmly down on the shaft J, causing it to act as a rigid extension of the arm $H^3$; but when the shaft J is rotated for discharging the bundle, a pin or spur, *j*, on said shaft strikes against a hooked end of a slide, $i^1$, and through a lever-arm, $i^2$, on a rock-shaft pivoted in the forked stud or spur, raises an arm secured to said rock-shaft in the slot or fork of said spur, and lifts the end of the spring free from said stud or spur, thus permitting the arm I to be raised for permitting the escape of the bundle. The rear arm $H^1$ being fixed, however, serves as a fulcrum, upon which the bundle is turned up on end, and thrown over upon the dumping-tray at the rear of the binder's stand, this movement being produced by the rotation of the compressing-arm $J^1$ with the shaft J after the grain has been bound. The arms $J^1$ perform the double function of compressing the gavel and holding it in convenient form to be bound, and then of discharging the same, as described. An arm, *k*, on the shaft J, passing a spring-stop $k^1$, attached to the frame, serves to prevent any backward movement of the shaft and compressing-arms while the bundle is being bound. The shaft J is mounted in overhanging bars K connected with the elevator-frame, and is provided with a loose pulley $k^2$, to which motion is imparted by a belt from a pulley on the elevator-apron shaft, or from any other convenient pulley for the purpose. A sliding friction-clutch, $k^3$, feathered to the shaft J, (see Fig. 5,) is moved into engagement with the pulley $k^2$ by the at-

tendant or binder pressing with his foot upon a pivoted shipping lever, L, when it is desired to rotate the shaft. The pulley and clutch are formed on their adjacent faces, the one concave, the other convex or hemispherical, for increasing their frictional grasp, the one upon the other, and when not held engaged by the lever L are held out of contact by a spring, *l*, applied between them, as shown in Fig. 5. Just underneath the arms $H^1$ $H^2$ $H^3$ is a table, M, which may be used in lieu of said arms as a receiving-table, if desired, but serving in this instance as an additional support therefor, said table being supported in front and rear by projecting bars $M^1$ attached to the elevator-frame. The rear end of the plank or table M has a longitudinal slot, *m*, cut in it, through which a transverse projecting bar, $M^2$, is adjustably connected with it by a through-bolt or set-screw, $m^1$. This bar $M^2$ is provided with angular brackets, $m^2$, in which is supported a transverse table-bar, N, to which the rear end of the band-table or binder's seat $N^1$ is attached, the forward end of said table being supported upon a bar, $N^2$, resting in angular brackets connected with the forward bar $M^1$. The brackets $m^2$ permit the bars N $N^2$ and table to slide in or out for diminishing the width of the machine, or for adapting the table N to hold the prepared bands, or to be used as a binder's seat or support. The slot *m*, in connection with a similar slot, *n*, in the
773 table N, adapts the bars $M^2$ and N to be moved forward, and with them an inclined chute, O, attached to the former for varying the position of the latter, over which the grain descends into the dumping-tray, to the adjustment of the rear arm $H^1$, in adapting said arm to the length of the grain or straw operated upon. Angular rods P P′, connected with the bars K, or to any other convenient point of support, either adjustably or rigidly, as preferred, serve to give direction to the movement of the bundle as it is being discharged by the rotation of the arms $J^1$. These rods P P′ are placed above the shaft J, and lie parallel therewith, in such manner that when the butt end of the bundle is raised it passes between said rods, and is by them prevented from being deflected laterally while being discharged, and is thus directed with precision to the inclined chute O, over which it passes to the bundle-carrier.

The arms $J^1$ are connected adjustably with the shaft J by sleeves or collars *j′*, and set-screws, by means of which the arm nearer the forward end of the shaft may be set slightly in advance of the rear one, and by this arrangement made to facilitate the operation of "up-ending" and discharging the bundle. $J^2$ $J^2$ are adjustable hubs on the shaft J, which serve to hold the grain away from said shaft sufficiently to facilitate the operation of passing the band around the bundle by hand. Q is the binders' stand, supported and sliding in and out upon extensions of transverse main-frame bars. Said stand has bars Q′ attached to it in front and in rear of the frame-bars, the bars Q′ being slotted at *q′*, and pins or bolts *q′* passing through said slots serve to limit the movement of the stand or support Q, while, at the same time, they prevent the support from tilting when drawn out into working position. The rear end of the sliding stand Q has a dumping tray or table, R, hinged to it, and at

the sides of said table are fastened foot-plates *r* or irons forming supports for angular rails or rods *s s'*, constituting stationary sides or guards around the tray. The upper one S extends around over the outer end of the tray and has an end board, R', hinged to it, said board being locked in position when the tray R is receiving the bundles by a pin, *r'*, at its lower edge passing through a perforation in the outer edge of tray R, but which releases the board and allows it to swing outward when the tray is dumped. The inner or forward end of the tray overhangs the stand Q, and is provided at its inner side with a standard or spur, *s*, with which a spring-hook, *t*, engages for holding the tray in proper position to receive the bundles. The spring-hook *t* is withdrawn for releasing the tray, when it is desired to dump the bundles, by a cord, *u*, operated by the driver. A second cord, *u'*, passing through suitable guides, and connected with the forward end of the dumping-tray, enables the driver to return the tray to proper position for receiving the grain after it has been dumped or tilted to discharge its load. In Fig. 6 I have shown a deflecting-apron, arranged at the upper end of the elevator, for changing the direction of the grain and turning it outward toward the binders. Ordinarily this has been done by bending the ends of the compressing-wires, as shown in Figs. 1 and 2.

Where this grain is heavy these bent ends of the compressing-wires *v* sometimes tend to check the movement of the grain. To remedy this the compressing-wires are shortened, leaving only the straight portion which holds the grain to the apron in its upward movement, and at the upper ends of these retaining or compressing-wires I place a short endless apron, W, extending across the upper end of the elevator and compressing-wires, and set obliquely thereto, as shown in Fig. 6, said apron moving outwardly on its under side on rollers *w w*, supported in standards W' connected with the elevator-frame. A pulley, *x*, on the end of the shaft of one of these rollers, may be operated by a band from a pulley on the elevator-roller shaft, or other convenient driving-shaft. The tongue or draft attachment may be connected either with the truck-bar or with the vibrating main frame, as preferred. When connected with the latter the pivotal support of the latter will require to be set farther back than where the draft is connected with the truck-bar or frame, as in such case the tendency of the draft would be to lift the cutters.

Having now described my improvements, what I claim as new, and desire to secure by letters patent, is—

1. The truck-bar or frame A, supported in front and rear of the main frame C, in combination with the said main frame pivoted centrally to and vibrating upon said truck-frame, substantially as described.

2. The main frame C C', connected with the truck-frame A by means of the link *c'* and *d*, arranged and operating substantially as described.

3. The upright endless apron G, or its equivalent, arranged at the inner end of the platform, and operating substantially as described

for moving the butts of the grain backward to clear the forward guard of the elevator, as set forth.

4. The combination, with the elevator and the compressing rods or wires *e*, of the deflecting-apron W, overhanging the grain-receiver and the upper end of the elevator, and operating substantially as and for the purpose set forth.

5. The concave grain-receiving arms or hooks adjustably secured to the inclined delivery board or chute H, substantially as described.

6. The receiving arm or hook $H^1$ extended outward and upward, and connected with the rod or shaft J, in combination with the arm $J^1$, arranged and operating substantially as and for the purpose set forth.

7. The receiving and compressing arm $H^3$, provided with
774 the jointed extension I, for releasing the bundle, arranged and operating substantially as described.

8. The compressing and discharging arms $J^1$, made adjustable upon the rotating shaft J, and operating in combination with the receiving-arm and fulcrum $H^1$, substantially as described.

9. The combination, with the jointed arm $H^3$, of the locking-spring $I^1$ and the spur *i*, and tripping-slide $i^1$, operated by a cam or projection on the shaft J, for releasing the jointed extension I, as set forth.

10. The rods or bars P, in combination with the discharging-arm $J^1$, for giving direction to the movement of the bound bundle in being discharged, substantially as described.

11. The adjustable inclined chute O, in combination with the adjustable receiving and compressing arm $H^1$, substantially as and for the purpose set forth.

In testimony whereof, I have hereunto set my hand this 6th day of February, A. D. 1875.

JOHN H. ELWARD.

Witnesses:
WM. H. MINNIX.
ALEX. MAHON.

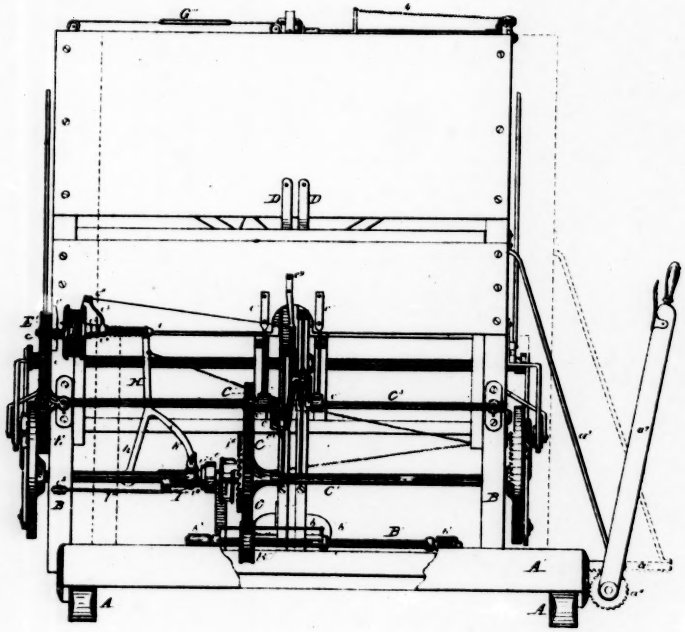
8 Sheets--Sheet 1.

**M. L. GORHAM.**
**Grain-Binder.**

No. 159,506. Patented Feb. 9, 1875.

No. 322.
Deering
v.
W. H. W. et al.
p. 775

*Fig. 1.*



Attest:
C. F. Frill
J. Mason Goszler

Inventor:
M. L. Gorham
by A. Crawford atty.

8 Sheets--Sheet 2.

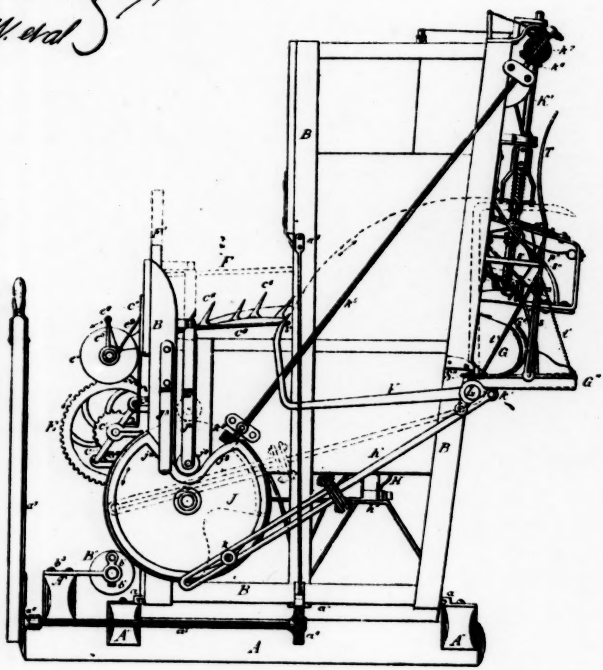
**M. L. GORHAM.**
**Grain-Binder.**

No. 159,506

Patented Feb. 9, 1875.

No. 322.
Deering
v.
W. H. W. et al
p. 776

Fig. 2.



Attest:
C. F. Fritz
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by N. Cramford
atty.

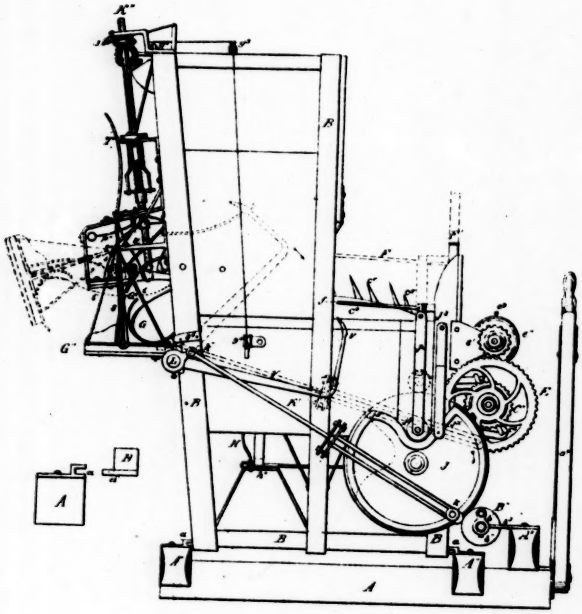
8 Sheets--Sheet 3.

**M. L. GORHAM.**
**Grain-Binder.**

No. 159,506. Patented Feb. 9, 1875.

No. 322.
Deering
v.
W.H.W. et al.
} h. 777

Fig. 3.



Attest:
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8 Sheets--Sheet 4

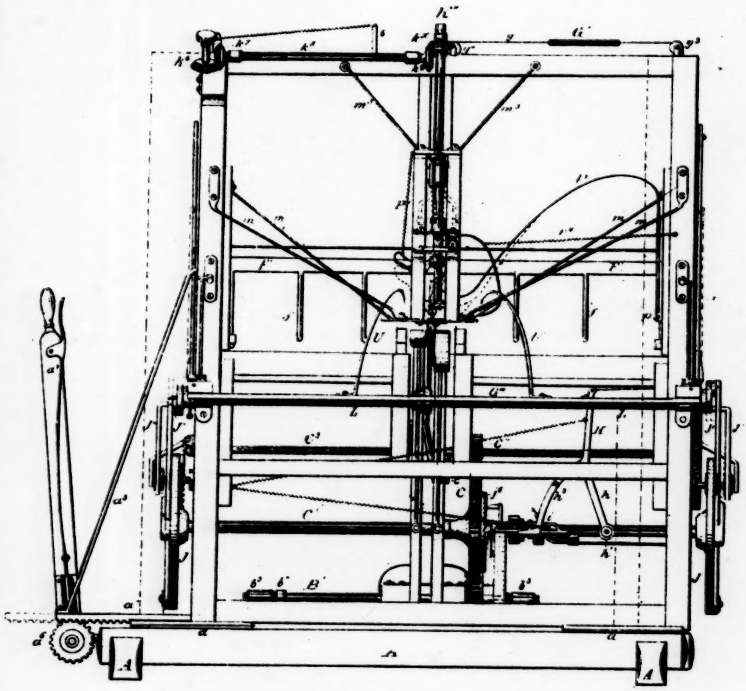
**M. L. GORHAM.**

**Grain-Binder.**

No. 159,506. Patented Feb. 9, 1875.

No. 322.
Deering
v
W. H. W. et al
h 778

Fig. 4.



Attest:
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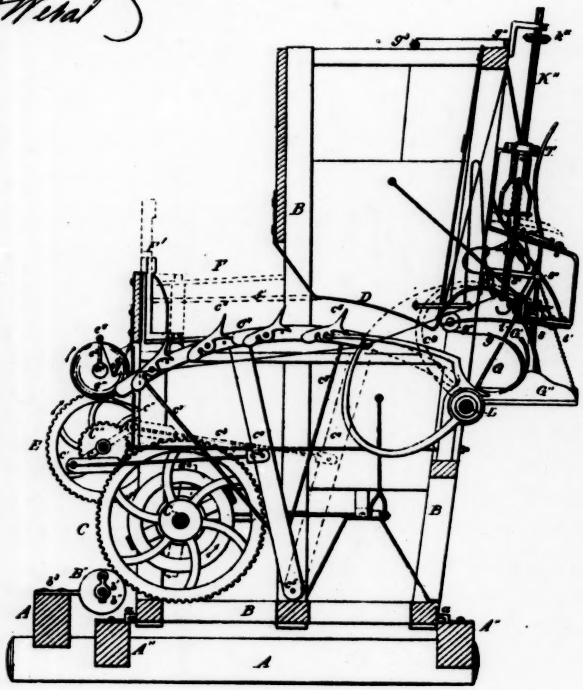
8 Sheets--Sheet 5.

**M. L. GORHAM.**
**Grain-Binder.**

No. 159,506. Patented Feb. 9, 1875.

No. 322,
Deering
v.
W. H. Wetal
} p. 779

Fig. 5.




Attest:
C. F. Fritz
J. Mason Gosz Co

Inventor:
M. L. Gorham
by N. Crawford atty.

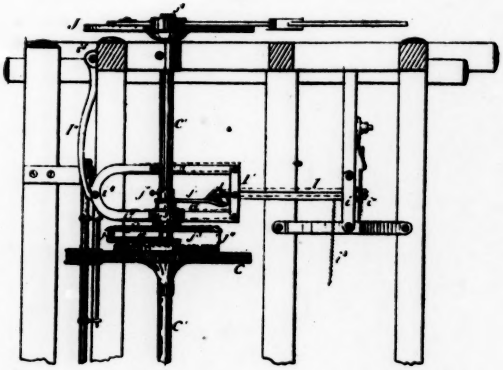
8 Sheets--Sheet 6.

**M. L. GORHAM.**

**Grain-Binder.**

No. 159,506. Patented Feb. 9, 1875.

*Fig. 6.*



No. 322.
Deering
v
W. H. W et al
h. 780

*Fig. 7.*

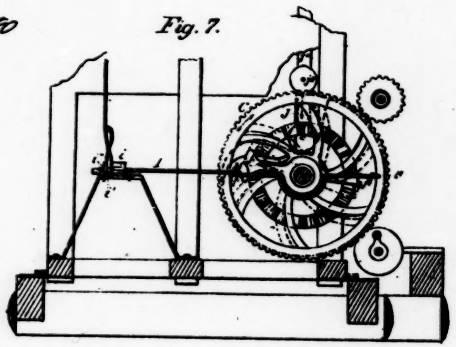
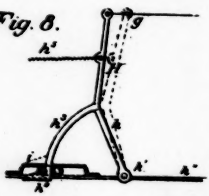


*Fig. 8.*



Attest:
C. F. Fritz
J. Mason Goszler

Inventor:
M. L. Gorham
by N. Crawford
atty.

8 Sheets--Sheet 7.

**M. L. GORHAM.**
**Grain-Binder.**

No. 159,506. Patented Feb. 9, 1875

No. 322. Deering v. Wm. W. Etal. } 4781.

Fig. 9.

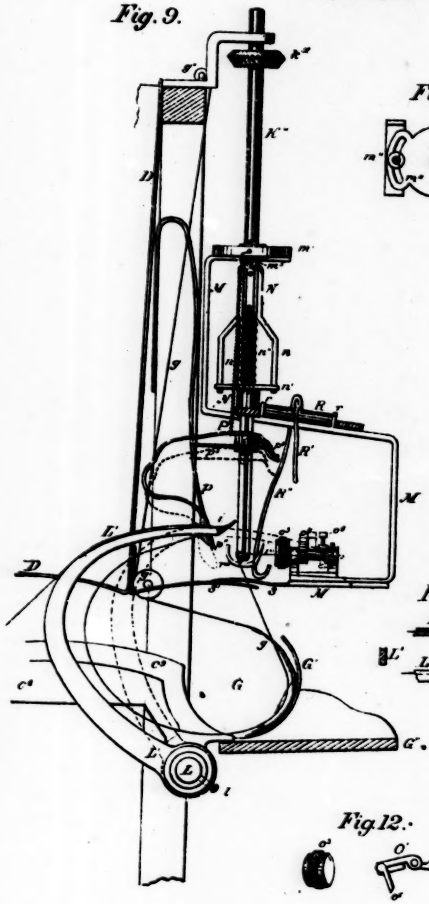


Fig. 13.

Fig. 10.

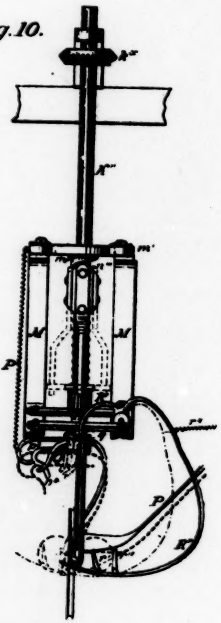


Fig. 9, a.

Fig. 10. a.

Fig. 11.

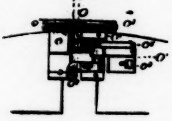
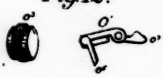


Fig. 12.



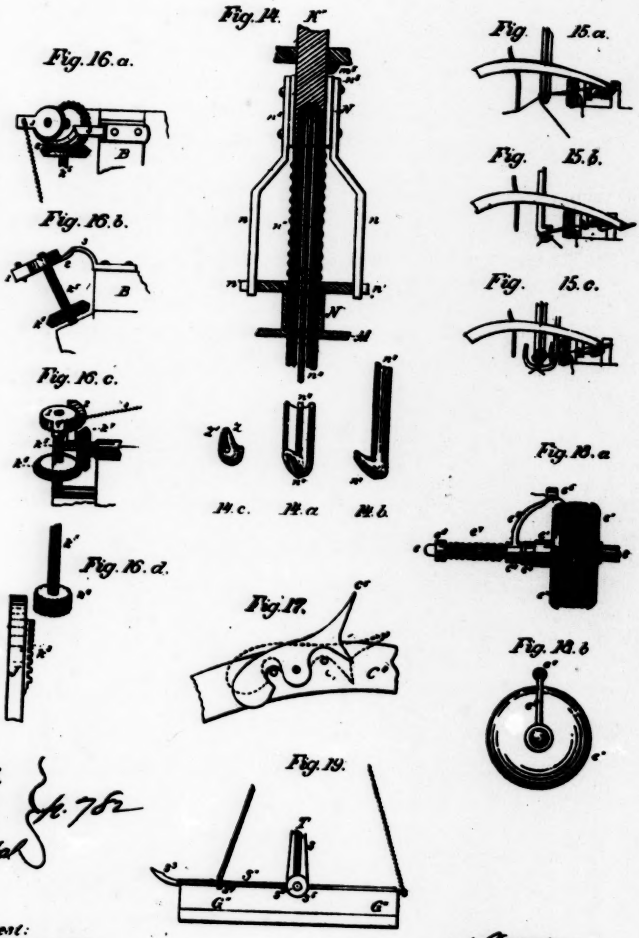
Attest:
C. F. Pritz
J. Mason Goszler

Inventor:
M. L. Gorham
by N. Crawford
atty.

8 Sheets--Sheet 8.

**M. L. GORHAM.**
**Grain-Binder.**

No. 159,506. Patented Feb. 9, 1875.




No. 322.
Deering
v.
W. H. W. Hal
p. 782

Attest:
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J. Mason Goetzler

Inventor:
M. L. Gorham
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atty.

783 UNITED STATES PATENT OFFICE.

MARQUIS L. GORHAM, of Rockford, Illinois.

*Improvement in Grain-binders.*

Specification forming part of Letters Patents No. 159,506, dated February 9, 1875; application filed September 12, 1874.

To all whom it may concern:

Be it known that I, Marquis L. Gorham, of Rockford, in the county of Winnebago, in the State of Illinois, have invented certain improvements in machines for binding grain, of which the following is a specification:

The object of this invention is to produce a machine for binding grain that will automatically receive the cut grain from the harvester, determine the size of the gavels or bundles, perfectly and securely tie the bundles, and when so tied discharge them from the machine without any interference or agency other than the machinery that operates it; and it consists in the construction and arrangement of the parts and devices, as will be hereinafter fully described.

In the drawings, Figure 1 represents a front vertical view of the machine; Fig. 2, an upright view of the left-hand side; Fig. 3, an upright view of opposite side; Fig. 4, an upright view of the rear or delivery end; Fig. 5, a vertical sectional view from front to rear; Fig. 6, a plan view of details; Fig. 7, a side view of same; Figs. 8, 9, $9^a$, 10, $10^a$, 11, 12, 13, 14, $14^a$, $14^b$, $14^c$, $15^a$, $15^b$, $15^c$, $16^a$, $16^b$, $16^c$, $16^d$, 17, $18^a$, $18^b$, and 19, enlarged details.

(Here follow diagrams marked pp. 775 to 782 incl.)

A represents the main longitudinal sills of a harvester extended to support the binder. A′ is a cross-tie, to hold the sills in position, and also to be a support to some of the actuating parts of the machine. A″ A″ are cross-ties, upon which the binder-frame is supported. B B represents the movable frame, that contains and supports the binder and its actuating parts. B′ is the driving-shaft of the binder, and is put in revolution by any suitable intermediate mechanism from the power that operates the harvester. B″ is a spur-gear wheel, loosely fitted upon driving-shaft B′, so as to slide longitudinally thereon when necessary, and has a hole parallel with the eye, that goes over the shaft and near the base of the teeth to receive a rod, *b*, which passes through the wheel and is held fast at each end by movable heads or dogs *b′*, that have eyes that receive the shaft B′, and are made fast thereto by holding-screws *b″*, so that when the dogs are fast on the shaft the wheel B″ will revolve with the shaft, and be left to freely slide upon the shaft the length of the rod between the driving-dogs *b′*. Shaft B′ is supported and held in bearings $b^3$ $b^3$ on cross-tie A′. C is a spur-gear

wheel on shaft C′, that revolves in proper bearings in frame B, and gears into driving-wheel B″, and from which it gets motion and becomes the driver to gear-wheel C″ on crank-shaft $C^3$, that is revolved in proper bearings on front of frame B. Crank-shaft $C^3$ has two cranks, $c$ $c$, projecting in opposite directions from the axis of the shaft, and is supported centrally upon each side of the cranks in bearings $c'$ $c'$ by suspending-rods $c''$ $c''$, that are cast at their upper ends to the frame B. $c^3$ $c^2$ are pitmen or connecting-rods working on cranks $c$ of shaft $C^3$, and are pivoted at $c^4$ to vibrating arms $c^4$ $c^4$, that are pivoted at $c^5$ to a cross-sill of frame B, so that, as the shaft $C^3$ revolves, the cranks, through the pitmen, give to arms $c^4$ a horizontal vibrating movement at their upper ends. $C^4$ $C^4$ are segments, attached to the upper ends of arms $c^4$, the peripheries of which are concentric with the pivotal center $c^5$ of vibrating arms $c^4$, and on these segments are a number of pivoted feed-dogs or teeth $c^6$. These feed-dogs are pivoted to the segments that, when in repose, or when the segment is vibrated in one direction, they will, by the way they are balanced, drop down, so that the points will only project a small distance above the segments, but when the segments are vibrated in the opposite direction, or in contact with any substance, they will rise, as seen in Fig. 5. The cranks projecting from opposite sides of the revolving shaft to which the pitmen connect with the arms $c^4$, will give to the segments alternately a forward and back movement, or when one segment vibrates in one direction the other is moving in the opposite direction. $c^7$ $c^7$ are braces, that go from the outer ends of the segments to near the bottom of arm $c^4$, to strengthen the outer ends of the segments. $c^8$ $c^8$ are curved guides, one on either side of the toothed segments, to hold the passing straw up from contact with the floor of the receiver, and insure a passage of all the straw by the teeth on the segments. $c^9$ is a guide to conduct and insure the direction of the unbound grain into the binding-receptacle, and is placed to be in the center or balance of
784 the bundle, and is in a line between the toothed feeding-segments $C^4$, and of such shape at its rear end as to form a part of the binding-receptacle. D D are guides, placed at a proper distance over the guides $c^8$, are curved on their under surfaces, and are concentric to the center of vibration or pivotal point of arms $c^4$, and parallel or nearly parallel to the curved faces of guides $c^8$, and are supported at their forward and upper ends to frame B, and at their rear ends by being bent nearly perpendicular, and extending upward to where they are attached to the rear and upper part of frame B. E is a gear-wheel on the edge of crank-shaft $C^3$, and revolves with shaft $C^3$, and gears into and gives motion to gear-wheel E′ on a short shaft, $e$, in bearings $e'$ projecting from and fast to frame B. Fast to the bearing of the short shaft $e$ is the non-revolving reel or cord spool $e''$, held on the bearing by a feather or other device to prevent revolution, to secure it in position and yet allow the spool to be quickly and easily removed from the shaft $e$. $e^3$ is a collar, fast on shaft $e$, and revolves with it. $e^4$ is an eye loosely fitted on shaft $e$, and can revolve thereon, and has bent arm $e^5$ projecting from it, and at its outer end has an eye, $e^6$, through which the cord

passes in going from the spool to the binding device. $e^7$ is a spiral spring around shaft $e$, between eye $e^4$ and washer $e^8$. The washer $e^8$ freely slides upon the shaft $e$, and can be adjusted to different distances from eye $e^4$, to give different degrees of friction to the revolving eye $e^4$, and regulate the tension of the cord.

This construction and arrangement of the fixed spool upon its shaft, and a yielding revolving tension-arm and guide for the cord, provide at all times a means to keep the cord at its proper tension, taking up any slack in the cord, and avoid the liability of breaking the cord, as the friction is adjusted upon the tension-arm to completely obviate any such disaster, as the momentum of the revolution of the arm in taking off the cord in binding is reduced to nearly nothing, as the arm that takes off the cord is so light that the friction regulates the tension and overcomes the momentum of the parts.

$e^9$ is a cord-guide, centrally attached to the front part of frame B, to give direction to the cord in going from the eye in arm $e^5$ to the binding devices. The frame that contains the binding devices is made to have a chamber, F, to receive the cut grain as it is delivered from the reaping part of the harvester, and is located transversely across the binding-machine and about midway of its height, with a tight wall at its front side and open at its ends. F′ is a vertically-reciprocating cut-off rack, sliding against the front wall of chamber F, and, when raised at its fullest height, cuts off the flow of the cut grain into binding device. The rack has horizontally-projecting fingers $f$, and a center one, $f'$, that projects beyond or farther from the front than the side ones, for the purpose of parting the cut grain, so that when the rack is raised up no more goes into the binding device during the operation of binding, as this long central finger rises up between the guides D and prevents any more of the grain from advancing until the rack falls down again after the grain that was forced into the binder is bound and discharged. This long central finger $f'$ performs another important function by its being in the center of the length of the straw or weight of the grain, and as it is raised up with the grain upon the fingers between the guides D, completely cuts off all straw that lies in an oblique angle to the finger, and makes a complete separation of the grain-stalks, so that no stray or straggling straw will be connecting two bundles when bound. G is the binding-receptacle, circular in form in cross-section, and composed of the central guide $e^9$ on the forward side, and the curved holder G′ on the rear, that is fast to the tilting platform G″ that tilts to discharge the bound bundles from the receptacle. $g$ is a flexible and adjustable binding strap and cord made fast to the curved holder G′, and thence to the upright part of guide D behind pulley $g'$ that is secured to guide D; thence upward over pulley $g''$, then horizontally in an angling direction to and over pulley $g^3$ on top of frame B; then down on the side of frame to and around pulley $g^4$; thence horizontally, or nearly so, to a bifurcated pivoted lever, H, to the upper end of which the strap or cord is secured. This binding strap and cord has at G‴ a device for adjusting the length of the cord between the binding-receptacle and the bifurcated trip-lever H, and by which adjustment the

amount of straw in the bundle is determined, and the bundles all bound of uniform length of bands. Lever H is pivoted at $h'$ to a stationary platform, $h''$, by the angular leg $h$, while leg $h^3$ is curved, and has a foot or trip, $h^4$, at its extreme lower end, and, as the top of the lever is vibrated, the foot $h^4$ will rise or fall, according to the direction the top is vibrated. $h^5$ is a spiral spring to hold the top of the lever to pull on cord $g$, and keep the foot down until a greater force is brought to bear upon the binding strap and cord than the spring can resist, when the spring expands and allows the top of the lever to be pulled over and the foot to be raised. I is a horizontal vibrating lever, having one end over the platform $h''$, and under a keeper-plate, $i$, and has at its end two friction-wheels, one, $i'$, to run upon the top of platform $h''$, and the other or outer one, $i''$, to allow the foot $h^4$ of lever H to pass over it easily. $i^3$ is a retaining-spring on lever I, to hold it in position. I′ is a horizontal yoke, made fast to lever I at its forward end, with an open space between the sides, and the forward circular end pivoted to arm I″, at $i^4$, while the arm at the other end is pivoted to frame B, at $i^5$. On one side of yoke I′ the side piece is made to be a ring, $i^5$, to surround and move a sliding sleeve, $i^6$, on shaft C′. $j$ is an inclined projection on the end of lever I, and projecting into the opening of yoke I′. $j'$ is
785 an arm with an inclined cam on its end, and fast upon shaft C′, and revolves with and can be adjusted upon the shaft, and held to any adjustment by the holding-screw $j''$. Upon the end of sliding-sleeve $i^6$, next the gear-wheel C, are arms $j^3$, that project at right angles in opposite directions, fast to the sleeve, carrying at the end of one arm a dog, $j^4$, that engages ratchet-teeth $j^7$ on gear-wheel C, which, when so engaged, revolves shaft C′ with wheel C, while the dog $j^5$, at the other end of arm $j^3$, engages a slotted arm, $j^6$, that is fast on shaft C′, and revolves with it. The arm carrying dog $j^5$, that engages the slotted arm $j^6$, is constructed in this manner for the purpose of reducing the friction developed by revolving the cam on arm $j'$, against the inclined surface $j$, on lever I, while the immediate function of the slotted arm $j^6$ provides a sliding way for the dog $j^5$, so remote from shaft C′, that when the arm $j'$, with its inclined cam, strikes the inclined projection $j$ on lever I, it prevents the locking or binding of the parts, and allows an easy lateral movement of the engaging parts, and the dog $j^4$ to be disengaged from the ratchet-teeth. J J are cams fast at each end of the shaft C′ and outside of frame B, and only revolve when shaft C′ revolves, and are used jointly to raise and lower the cut-off rack F′, and for other purposes, to be hereafter explained. These cams are in form of a circle, with a portion on one side removed to near the eye, forming an open space narrower toward the eye than at the rim, as seen in Figs. 2 and 3. J′ J′ are vertical arms attached at their upper ends to the cut-off rack F′, with a brace-arm, J″, extending outwardly from arm J′, to receive a shaft, $j^8$, that has friction-wheels, $j^9$, to reduce friction where the wheels are in contact with the moving parts of the cam J, and the necessary guides $J^3$. The cams J being in revolution, the side of the opening $j^9$ acts to raise the cut-off rack through the friction-wheels, until the friction-wheels mount the rim of the

cam, and travel upon the rim until, in the revolution of the cam, the friction-wheels are at the opposite side $j^x$ of the opening on the cam, when, by the weight of the rack, it and the friction-wheels fall down, until the friction-wheels, in the opening, touch the bottom, and as the rack falls the cams stop their revolution. K and K′ are slotted, jointed, and adjustable connecting-rods, attached to the cams J by the wrist-pins $k$ $k$, that work in the slots of the rods, and on one side of the machine one rod is connected to the crank $k'$ on rack-shaft L, and on the opposite side to crank $k''$ on rock-shaft L. The cranks $k'$ and $k''$ are placed upon shaft L to project nearly in opposite directions. $k^3$ is a segmental gear on the inside of the cam J, on the left-hand side of the machine, and in the revolution of the cam engages gear-wheel $k^4$ on inclined shaft $k^5$, that revolves in bearings on the side of frame B, near the upper end of shaft $k^5$, and fast thereon is gear-wheel $k^6$, that gears into and revolves gear-wheel $k^7$, that is fast on horizontal shaft $k^8$, that revolves in bearings on the rear side of frame B, extends, to near the center of the width of the machine, and has gear-wheel $k^9$ at its center end, gearing into gear-wheel $k^{10}$, that is fast upon upright knot-tying shaft K″ and revolves it once before the segmental gear $k^3$ is out of gear with the gear-wheel $k^4$. On the top of inclined shaft $k^5$ is a crank or a collar, 1, carrying a concentric segmental bent arm, 2, that, as the shaft $k^5$ revolves, the collar and arm revolve with and make a little more than a revolution. 3 is a fixed dog or stop, fast on the frame B. 4 is a spiral spring, attached to the crank or collar 1 at one end, while the other end is fast to stud 5 on the frame.

As the collar and its bent spring-arm revolves, the arm goes over the end of the stop 3, and as the end passes off the dog, by the excess of one revolution, the end of spring-arm 2 will drop down off the dog, when the spring 4 will act on the collar to bring the end of the spring-arm back to abut against the dog 3, which makes an elastic stop, and prevents any bad effect that might occur if the motion was suddenly and positively stopped at the end of the revolution.

M is a frame for supporting, and contains, the actuating parts of the knot-tying, band-cutting, and band-discharging devices, and is suspended and held in its position on frame B by the brace-rods $m$ $m$ $m$ $m$. $m'$ is a concentrically-slotted plate, centrally through which passes the knot-tying shaft K″, and is made fast to the upper part of the frame M by holding-screws $m''$, and to the frame B by the braces $m^3$. $m^4$ $m^4$ are concentric slots in plate $m'$. N is a sliding sleeve, with arms $n$ $n$ on opposite sides, and is loosely fitted on the knot-tying shaft K″ underneath plate $m'$. N′ is a fixed collar, with arms $n'$ on opposite sides of its center, slotted at their ends to receive the lower ends of arms $n$ $n$. $n''$ is a spiral spring around shaft K″, beneath the sleeve, above the collar N′, and between the arms $n$ $n$. On the upper end of sleeve N is an upwardly-projecting inclined cam, $n'''$, that, in the revolution of the sleeve, strikes against an inclined cam, $m^5$, on the under side of plate $m$, which forces the sleeve N and its arms $n$ down. The lower half of the knot-tying shaft K″ is centrally bored to receive the shaft of cord-hook $n^4$, that extends up-

ward in the shaft K″ far enough to have two grasping-jaws, $n^4$, that are fast to the sliding sleeve, and on opposite sides thereof, to take hold of the upper end of the spindle or shaft of the cord-hood $n^4$, and securely hold it in their grasp. The sides of the bored part of the shaft K″ are slotted to allow the grasping part of the jaws to slide freely therein. The knot-tying shaft K″ has, at its lower end, a cord-hook, $z$, projecting from one side upward to receive and hold thereon the cord, so that, as the hook is revolved in tying the knot, the cord passes under the hook and forms the loop of the
786 knot. In the lower curved surface of hook $z$ is a radial groove, $z'$, extending from the bore for the spindle that is in the center of the shaft K″ outward to near its terminal point. This groove is to receive the hook on spindle $n^4$, with the cord between the two hooks, and so that the loop in the cord will pass over the hook on spindle $n^4$, in forming the knot, as the shaft K is revolved. Shaft K″ is cut away on the hook side, from just above the hook, about half its diameter, and high enough to allow the cord-carrier to freely pass by in compressing the bundle and carrying the cord over the cord-hook.

This construction is for the purpose as follows: The spring $n'$ holds the hook of spindle $n^4$ up, with the cord above it, against the the under side of the hook of the knot-tying shaft, to prevent any slipping of the cord during the operation of tying the knot, and, when the knot is made, to still hold its gripe on the cord until the cord is forced out from between the two hooks, and the knot drawn tight and hard. The hooks are separated by the cam on the upper side of sleeve N striking against the cam $m^5$ on the under side of plate $m'$, forcing the spindle of the cord-hook down.

L is a horizontal transverse rock-shaft, rocking in bearings fast to the frame B, and is caused to be turned or rocked back and forth by the connecting-rods K and K′ and cranks $k''$, one of which cranks forces it to rock in one direction, and then the other to return it to its original position. Centrally of the length of shaft L, and fast thereto, is secured the bent cord-carrier and bundle-compressor L′, held in place by holding-screw $l$, and rocks or vibrates with the rock-shaft L, on the outer curved edge of which is a groove, in which lies and is carried the cord to a slit on one side of the groove, to let the cord pass to one side of the carrier; thence the cord passes laterally through an eye, $l'$, in the end of the carrier. O is a device for receiving and holding the cord fast on frame M, and is composed of two blocks, $o$ and $o'$. Block $o$ has journaled in it a shaft, on which is a projecting grooved elastic-faced wheel, $o''$; and block $o'$ has also a shaft, carrying another projecting wheel, $o^3$, having a tooth-disk to fit into the groove in wheel $o''$, and between which wheels the cord for binding is placed by the carrier L′, and carried to the proper position by the teeth on wheel $o^3$ by a partial revolution of wheel $o^3$, and there held until another advance to revolve the wheel is made. The wheels $o''$ and $o^3$ are pressed together, so that the grooved flexible wheel will envelope, for a considerable distance, the periphery of the toothed wheel, which will hold the cord and prevent its slipping. On the same shaft with wheel $o^3$ is a

ratchet-wheel $o^4$, having the proper teeth to revolve wheel $o^3$; and also on the same shaft, and loosely fitted thereon, is a tilting device, O′, carrying a pivoted pawl, $o^6$, on the side next the ratchet-wheel, to engage with the teeth of the ratchet-wheel when the device is tilted in one direction, and at the opposite side of the tilting device from the pawl is a foot, $o^7$, upon which the end of the cord-carrier strikes and forces it down, and as it is so tilted the pawl engages a tooth on wheel $o^4$ and revolves wheel $o^3$ a partial revolution, and as the cord-carrier is lifted from the foot $o^7$ the opposite side of the tilting device is balanced to bear it down to rest upon the gage-screw $o^8$, so that the pawl will be out of contact with the teeth on ratchet-wheel $o^4$, and ready for another advance movement. P is a bent cord-latch, pivoted at $p$ to the frame B, then rising upward, and bending inward and downward to the center of the width of the machine, and just forward of the knot-tying shaft to the latch or point $p''$, where it comes in contact with the cord, then bends horizontally, then upward a short distance, and then curved around nearly horizontally to the opposite side of the tying-shaft from its pivoted end to where it suddenly bends downward, then horizontally in a direction toward the tying-shaft, where it is connected to pivoted guide-arm $p''$, and then it connects to a circular carrier, $p^3$, of less diameter, and within the curvature of the latch-arm, which has an inclined arm, $p^4$, extending a distance below the curved horizontal portion. P″ is a spiral spring, attached at its lower end to the latch-arm P near to where it connects with the guide-arm $p''$, and at its upper end to the top of frame M, or other convenient solid part. This spring is for the purpose of returning the arm of latch P to its proper position after a knot is tied. Q is a bent projecting arm from an eye, $q$, around the knot-tying shaft K″, and revolves with it, and as it revolves strikes against the inclined arm $p^4$ of latch-arm P and forces the latch down upon the cord at the proper time. When the arm Q has forced the latch down it holds it there until it passes off of the return circular carrier $p^3$, when the latch will rise by the power in spring P″ to its original position. This latch when thus held upon the cord, prevents any derangement of the cord while the loop is being formed and the knot tied. R is a rock-shaft, working in bearings $r$ $r$ that are fast to top of frame M. R′ is a bent arm, attached to the rock-shaft, and bending downward below the path of the revolution of arm Q, while another bent arm, R″, passes on the opposite side of the rock-shaft downward, and curves toward, underneath, and past the knot-tying shaft K″. On arm R″, near its terminal end, is an upwardly-projecting knife, $r'$, to cut the cord, while farther back from the end than the knife is a curved and upwardly-projecting arm, $r^3$, to force the cord off the knot-tying hook after the cord is cut by knife $r'$. $r^4$ is a spiral spring fast at one end to the bent knife-arm R″, and the other end fixed to the frame B. This device for cutting and removing the cord is operated by the revolution of the arm Q on shaft K″, and striking against the lower part of arm R′, and carries it forward, rocking the shaft, and forcing the arm R″ on the opposite
787 side of the rock-shaft that carries the knife and bent arm, to

advance toward the knot-shaft, the knife passing on one side of the shaft and severing the cord between the shaft and cord-holding wheels, and passing forward until the bent arm passes on the other side of the shaft, and forces the cord off the hook, and as this is accomplished the arm Q has lost its hold of arm R′ when the spiral spring $r^4$ acts to pull the knife and bent arm on arm R″ back to their former position. S and S′ are shields for the knot-tier to prevent any substance from interfering with the operation of tying the knot. S is attached to the bottom of frame M, and is directly underneath the knot-tying shaft K″, curves slightly upward for a distance from frame M, and then is horizontal, or nearly so, to its end. S′ is attached to the upright part of guide-plates D a trifle higher than shield S, and to one side of it, but having their approximate sides vertical to each other, which will allow the cord to pass between them, but prevent straw from clogging the small horizontal space between them. Above these shields, and below the knot-tying hooks, is a free open space for discharging the pieces of cord that may be left after tying and cutting, or other litter that may accumulate thereon. G″ is a tilting platform in horizontal position, and supported by upright arms *s*, rigidly secured at each end, which arms are pivoted at *s″* to horizontal arms *s′* that are rigidly attached to the frame B. S″ S″ are latch-arms, one at each end of the platform G″, and when holding the platform are in a horizontal position, and have a catch, $s^3$, at their terminal ends to take hold of a projecting stud, $s^4$, on the frame B, and keep the platform in position when latched. These latch-arms are fixed to eyes $s^5$ that surround fixed shafts $s^6$, so that the eyes can rock on their shafts and unlatch the platform from the frame and allow it to tilt. $s^7$ $s^7$ are guides over latch-arms. T T are upright and bent levers fixed to eyes $s^5$ on their top sides. *t t* are braces from the straight part of levers T to near the outer ends of the latch-arms S″, to strengthen the levers in operating to throw the latches out of their hold with the studs $s^4$, and release the platform, so as to tilt. *t′ t′* are spiral springs, their upper ends fast to the bent levers T, and their lower ends secured to the outer edge of the platform, for the purpose of returning the latch-arms to their proper position after they have been forced out of their hold on studs $s^4$. U U are bundle-discharging hooks, fixed at their lower ends upon the top of platform G″, are bent and inclined toward each other at their upper or hook ends, and, when the platform G″ is tilted or swung away from the frame, will surely discharge the bound bundle of grain from the binding-receptacle. V V are bent spring-arms, with catches *v* near their outer ends, and inclined from the extreme points to the catch, to be thicker at the catch, and are fast upon rock-shaft L, and vibrate with it.

As the rock-shaft is partly rotated by the connecting-rod that is attached to cranks *k′*, and, as the rock-shaft is so rotated, the spring-arms V are carried upward to engage their catches on the levers T, where they remain until the cranks *k″* act to pull the spring-arms that have hold of levers T back, when the latch-arms are disengaged from their holding-studs, and the platform is tilted over and kept

tilted until the catches on arms T pass off at the ends above the bent part.

To deliver the grain from the reaper into the binder in a proper manner, the center of the length of the straw of the grain must be directly in line with the tying device; and, as standing grain is not always the same height or length of straw, it is necessary to provide for the adjustment of the binder to have the right position with relation to the delivery of the grain into the binder. To successfully do this the binder with its frame is constructed to be instantly and easily adjusted upon the frame of the reaper by the following construction: Upon cross-ties A'' are guide-plates *a a*, held by screws, with grooves in their inner edges, and on the under sides of the transverse sills of frame B are fixed projecting plates *a' a'*, that fit and slide in the grooves or guide-plates *a*. This construction allows of a horizontal transverse movement of the frame of the binder upon the sills of the reaper. Directly under and fast to the center sill of the binder-frame is a rack, *a''*, projecting beyond the frame on one side, as seen in Fig. 1, and having a supporting-brace, $a^3$, to support the projecting end. $a^4$ is a toothed pinion, that gears into rack *a''*, and is fast upon horizontal shaft $a^5$, that is secured and turns in bearings that are fast to the reaper-sills. $a^6$ is a toothed or indent wheel on the shaft $a^5$. $a^7$ is a lever, turning on shaft $a^5$, with a spring-catch attached, that can be quickly raised out of the indents in wheel $a^6$, and the lever turned to have the catch take into another indent, and, by swinging the lever, shaft $a^5$ and tooth-wheel $a^4$ will be partially rotated, which reciprocates the rack *a''*, and the frame B will move with the rack whichever way it reciprocates.

This construction affords an easy and sure way of adjusting the binding devices to be in the exact position relatively with line of delivery of the unbound grain from the reaper into the feeding and binding device; and as the hand-lever $a^7$ is in easy reach, and the operative parts of the feeding, binding, and discharging devices are in view of the driver, the binder-frame B can be adjusted while the machine is in full operation, as the height of the grain may and does change at different parts of the same swath, or on different sides of the same field, and requires a change in the position of the binder-frame; consequently the cord is placed around the grain, and the bundle is bound in the right place, or at the center of the length of the straw of the cut grain.

788 The operation is as follows: The binding-cord being in place, by passing it from the spool through the guides, over the cord-carrier and through its eye, over and beyond the hook of the knot-tier to the cord-holder, and there securely held, the binder adjusted properly upon the frame of the harvester to deliver the grain centrally with the line of the knot-tying device, the machine is put in motion by the forward movement of the harvester. The cut grain flows into the receptacle of the binder, and is fed toward the bundle-receptacle by the movement of the feed-dogs, and against the curved holder, binding-cord, and adjustable binding-strap, which, when the unbound grain is pressed against the strap sufficiently, causes the trip-lever to which it is attached to move and

allow the other parts of the device to operate. As the movement of other parts is now affected, a vertically-working rack in the receptacle is raised, which holds back the inflowing grain, while that which has passed off the rack is advanced by the feed-dogs, to make a clear open space behind it, so that the cord-carrier can grasp it and compress it in the binding-receptacle while the knot is tied on the cord that surrounds it. By the first movement of the trip-lever through its connection the cam-shaft, with its cams, are put in revolution, which causes the cut-off rack to rise, and in their continued revolution hold the rack in its raised position until the bundle is bound, the cord cut, and the bundle discharged, and the rack is caused to fall by its own weight by the termination of its support on the periphery of the cams. The feed-dogs force the grain from the point where the long central finger of the rack parted the grain forward of and beyond the end of the cord-carrier opening, a space through which the cord-carrier and cord safely pass without obstruction by the straw, and the movement of the cord-carrier continuing the cord is carried and placed in the knot-tier, thence onto the teeth of the projecting disk-wheel, and carried by the partial rotation of that wheel into the groove of the elastic faced wheel and held fast, while the cord carrier and compressor moves still further forward in order to furnish a slack cord while the loop is being formed by the rotation of the knot-tier, to prevent the breaking of the cord in tying the knot. When the cord-carrier and compressor has reached its ultimate forward movement the grain is held between it and the curved holder G'. At the time the cord is being grasped and forced between the wheels of the cord-holder the segmental gear upon the cam-wheel engages with the pinion of the shaft that rotates the knot-tier. At the time that the cord-carrier and compressor moves to produce the slack the knot-tier turns to take up the slack in forming the loop and tying the knot. In continuing the rotation of the knot-tier, the bent arm attached thereto strikes against the inclined portion of the cord-latch (the cord having previously passed by and under the latch) and forces it down, and securely holds it in the knot-tier while the loop is being formed. At the time the loop is being formed around the upward-projecting part of the knot-tier the cam-arm attached to the sleeve meets and is pressed down by the cam. This carries with it the grasping-hook, which opens at the proper time and passes under the cords between the knot-tier and cord-holder. This being done the sleeve-arm passes beyond the cam, and being free to rise is pressed upward with the full force of the spring, so that the cords are held between the cord-grasping hook and the knot-tier hook in such a manner that the knot will be firmly drawn up, yet the ends will be allowed to yield and pass out from between the cord hook and the knot-tier hook before the cord can be broken. At the proper time the bent arm attached to the knot-tier also reaches the arm of the rock-shaft carrying the knife and hook, and the knife is moved rapidly forward and severs the cord near the cord-holding wheels. Then the hook or bent arm strikes against the cords between the bundle and knot-tier, and moving rapidly forward forces the loop over the ends of the cord that is

held between the knot-tier and grasping-hook, and does not stop until the severed ends of the cords are forced from between the cord-grasping hook and knot-tier, and the bundle is left perfectly bound and free to be discharged. The continued rotation of the cam-wheels have now carried the wrist-pin on right-hand side to the extremity of the slot of the connecting-bar, which causes the rock-shaft of the cord carrier and compressor to be moved back to its original position, and as the spring-latches that are attached to the rock-shaft and move with the cord-carrier, and take hold of the lock-levers at a point above where the holding platform is hinged it is unlocked and rapidly tilted the discharging-hooks attached thereto force the bundle from the receptacle. The spring-latches now pass beyond the end of the lock-levers and the platform returns back again and is securely locked to the frame for the next bundle. It will also be seen that the binding-cord will be held the same as at the commencement of the operation and ready for the next bundle. The continued rotation of the cam-wheels, and consequently the cam-shaft, will have arrived at the point where the cam upon the cam-arm of the cam-wheel shaft will engage with the cam upon the yoke of lever. This will cause the end of the lever to move under the horizontal portion of the bifurcated trip-lever, and it will continue so to move by the power of the driving mechanism until the dog is disengaged from the ratchet-teeth upon the side of the gear-wheel, when the power of the driving mechanism to carry it farther will cease. At this time the friction-wheels that suspend the lifting cut-off rack will have arrived at the inclined portion of the cam-wheels, and as the rack, and consequently the friction-wheels that support it, fall vertically upon the inclined part of the cam, the cam-wheels, and consequently it farther will cease. At this time the friction-wheels that suspend the lifting cut-off rack will have arrived at the inclined portion of the cam-wheels, and as the rack, and consequently the friction-wheels that support it, falls vertically upon the inclined part of the cam, the cam-wheels, and consequently all the parts attached thereto, are forced still farther around until the entire revolution is made. This causes the lever to move so far that the concentric part of the bifurcated trip-lever slips over the roller upon the end of the trip-lever, and by the power of the spring attached to the trip-lever it is drawn down over the roller until arrested by the adjusting-strap, when the binding mechanism will be entirely disengaged and held from the power that drives it, as at the commencement of the operation.

789

Having thus described my invention, what I claim, and wish to obtain letters patent for, is—

1. The hand-lever $a^7$, toothed-wheel $a^6$, shaft $a^5$, gear-wheel $a^4$, and rack $a''$, in combination with the frame B of a grain-binder, constructed substantially as and for the purpose described.

2. The revolving crank-shaft $C^3$, having cranks $c$ $c$, in combination with the segments $C^4$, having the feed-teeth $c^6$ and their intermediate operating parts, substantially as described.

3. The reciprocating segments $C^4$, having the feed-teeth $c^6$, in combination with the guides D, as and for the purposes specified.

4. The curved guides $c^8$ on either side of the feeding-teeth $c^6$, and parallel with their motion, in combination with the center guide, $c^9$, reciprocating segment $C^4$, feed-teeth $c^6$, and binding-receptacle G, as and for the purpose specified.

5. The revolving tension and take-up arm $c^5$, having eye, $c^6$, through which the binding-cord passes, in combination with a non-revolving cord-spool, $c''$, that contains the binding-cord, constructed substantially as and for the purposes described.

6. The combination of the cord-spool $c''$, revolving arm $c^5$, having eye $c^6$, and guide-arm $c^8$ with the curved and grooved cord-carrier L′, substantially as and for the purpose described.

7. The curved and slit cord-carrier L′, and grooved on its outer edge, having eye L′ transversely through the outer end, where the cord is delivered onto the knot-tying hook and cord-holding device O, substantially as and for the purposes described.

8. The cord-carrier and bundle-compressor L′, in combination with the curved holder G′ and cord-holding device O, constructed and arranged to produce sufficient slack in the cord for tying the knot, substantially as described.

9. The shields S, attached to frame M, and S′ to guide D, constructed and arranged with relation to each other and the knot-tying device, and for the purpose described.

10. The flexible strap $g$, arranged in receptacle G to operate lever H in the manner substantially as and for the purposes described.

11. The combination of the binding strap and cord $g$ with the bundle-receptacle G and tooth-feeding segments $C^4$, substantially as and for the purposes described.

12. The combination of the trip-lever H, horizontal lever I, shaft C′, and gear-wheel C, and their intermediate devices, constructed substantially as and for the purpose described.

13. The combination of the cam $j$ on lever I, cam on arm $j'$, sliding sleeve $j^6$, with arms $j^3$ and dogs $j^4$ and $j^5$, slotted arm $j^6$, with the ratchet-teeth $j^7$ on wheel C, substantially as described.

14. The arms $j^3$, with dogs $j^4$ and $j^5$, in combination with the slotted arm $j^6$ to form a clutch-connection with the ratchet-teeth on wheel C, substantially as described.

15. The revolving cams J J, in combination with the vertically-reciprocating rack F′ and their intermediate operating devices, substantially as and for the purpose described.

16. The vertically-reciprocating rack F′, having the horizontally-projecting fingers $f$ and center long finger, $f'$, in combination with the guides D, substantially as described.

17. The combination of the cam J, slotted connecting-rod K, crank $k'$, rock-shaft L with the cord-carrier and bundle-compressor L′, substantially as described.

18. The combination of the cams J J, slotted connecting-rods K and K′, cranks $k'$ and $k''$, bent spring-arms V V with vertical levers T, latch-arms S″, and tilting platform G″, substantially as and for the purposes described.

19. The combination of the segmental gear-teeth $k^3$ on cam J, train of gears and their shafts $k^4$, $k^5$, $k^6$, $k^7$, $k^8$, $k^9$, and $k^x$ with the knot-tying shaft K″, substantially as described.

20. The combination of shafts $k^5$ $k^8$ and knotting-shaft K″ and their driving-gears with crank 1, spring-arm 2, and stop 3, as and for the purpose described.

21. The combination of the sliding sleeve N, having pendent arms $n$ $n$, sliding in slotted arms $n'$, grasping-jaws $n^5$, and spring $n''$ and actuating devices with the reciprocating cord-hook spindle $n^4$, that slides in the knot-tying shaft K″, as described.

22. The yielding and bent cord-latch arm P with latch $p''$, and bent in the form substantially as and for the purposes described.

23. The combination of the arm Q on shaft K″ with the arm $p^4$ on latch-arm P, substantially as and for the purpose described.

24. The combination of the arm Q on shaft K″ with arm R′ and bent arm R″ on rock-shaft R, and carrying the cord-cutting knife $r'$, substantially as described.

25. The combination of arm Q on shaft K″ with arm R′ and bent arm R″ on rock-shaft R, and carrying the projecting cord-arm $r'''$ to force the cord from the knot-tying device, substantially as described.

790 26. The combination of arm Q on shaft K″ with arm R′ and bent arm R″ on rock-shaft R, carrying the knife $r'$ for cutting the cord, and arm $r'''$ for forcing the cord off the hook, substantially as described.

27. The combination, with the tilting platform G″, of the discharging-hooks U U, as and for the purpose described.

28. The combination of the grooved elastic-faced wheel $o''$ on fixed axle with the toothed disk-wheel $o^3$, between which the binding-cord is held, substantially as described.

29. The combination of the cord-carrier and bundle-compressor L′ with the tilting device O′, having pivoted pawl $o^6$, foot $o^7$, ratchet-wheel $o^4$, and cord-carrying wheel $o^3$, substantially as and for the purpose described.

30. The upwardly-projecting hook $z$, having groove $z'$ therein, in combination with the cord-hook on spindle $n^4$, substantially as and for the purpose described.

31. The combination of the falling rack F′ with the inclined recesses in cam J for the purpose of continuing the rotation of the shaft to replace the lever I in position with lever H to make a successful operation, substantially as described.

32. The vertically-rising holding-rack F′ and its dividing-finger $f'$, so arranged with relation to the feed-dogs $c^6$ as to part the unbound grain and make an open space through which the cord-carrier L′ passes, substantially as and for the purpose described.

MARQUIS L. GORHAM.

Witnesses:
C. T. FRITZ.
J. MASON GOTZLER

793 UNITED STATES PATENT OFFICE.

JOHN H. GARNHART, of Madison, Wisconsin.

*Improvement in Binders' Attachments for Harvesters.*

Specification forming part of Letters Patent No. 142,331, dated September 2, 1873; application filed January 11, 1873.

To all whom it may concern:

Be it known that I, John H. Garnhart, of Madison, in the county of Dane and State of Wisconsin, have invented certain new and useful improvements in grain-harvesters; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings forming part of this specification, in which—

Figure 1, sheet 1, is a perspective view of a harvester containing my improvements, looking obliquely from the front toward the elevator-platform. Fig. 2, sheet 1, is a perspective view of the same, looking obliquely from the front toward the grain-receptacle, binders' tables, and binders' seats. Fig. 3, sheet 2, is a perspective view of one of the seat-standards. Fig. 4, sheet 2, is a perspective view of a seat detached from its standard. Fig. 5, sheet 2, is an elevation showing the upper end of a seat-standard. Fig. 6, sheet 2, shows the method of pivoting the sheet-standards to the frame of the machine.

Similar letters of reference in the accompanying drawings denote the same parts.

(Here follow diagrams marked pp. 791 & 792.)

My invention has for its object to improve that class of harvesters which are provided with endless rake-aprons to receive the cut grain and deposit it in a grain-receptacle near the binders' tables, to be bound by hand and discharged from the machine. To this end, the invention consists, first, in the employment of a grain-receptacle made of two or more pieces hinged together and to the frame of the machine, by means of which construction the receptacle may be so folded out of the way as to afford easy access to the interior for the purpose of raising and lowering the machine for oiling the parts, or for similar objects; second, in the employment of adjustable binders' seats, the standards of which are adjustably pivoted to the frame of the machine, so that the position of the binder with regard to his distance from the binders' table may be varied at pleasure, and so that the seats may be turned in close to the machine when passing through gates, &c.; third, in pivoting the binders' seats to their standards, so as to allow the binder to turn from the grain-receiver to his table, to bind a bundle more readily and with less strain and fatigue; fourth, in adapting the binders' seat for vertical adjustment upon its standard; fifth, in so connect-

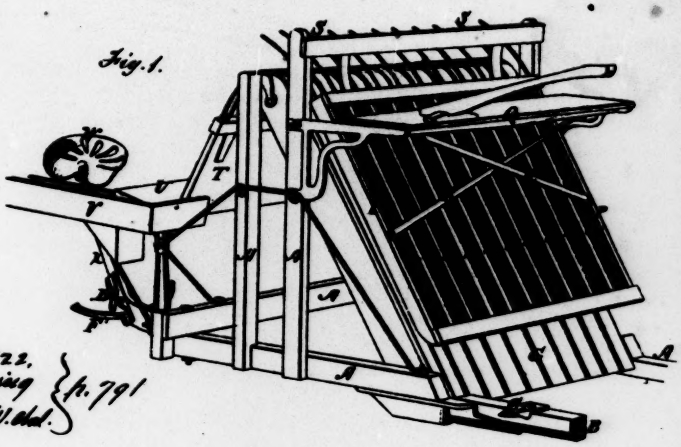
2 Sheets--Sheet 1.

J. H. GARNHART.

Binders' Attachments for Harvesters.

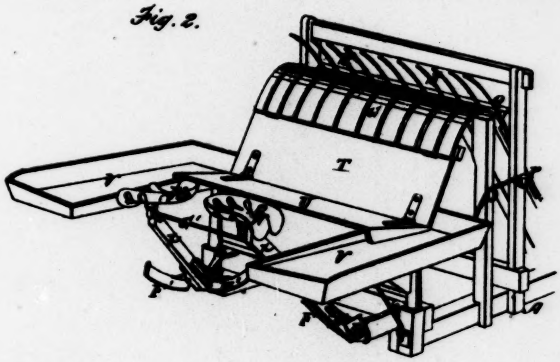
No. 142,331. Patented September 2, 1873.

Fig. 1.



No. 322, Deering & W. H. W. Ohl. } p. 791

Fig. 2.



Witnesses.
C. F. Brown.
Melville Church.

Inventor.
J. H. Garnhart.
by his Attys.
Hill & Ellsworth.

2 Sheets--Sheet 2.

# J. H. GARNHART.

## Binders' Attachments for Harvesters.

No. 142,331. Patented September 2, 1873.

Fig. 5.

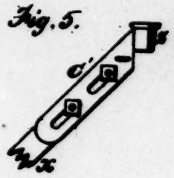


Fig. 3.

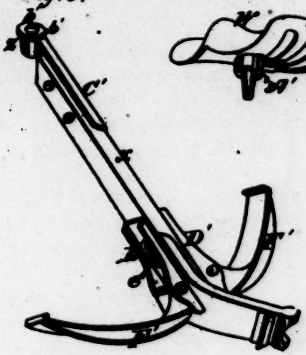
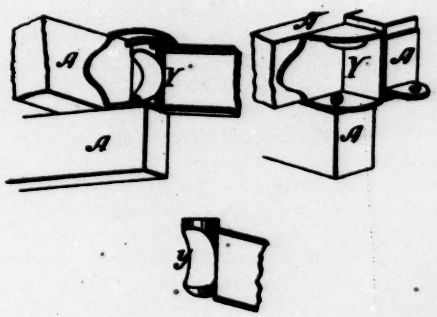


Fig. 4.

No. 322.
Deering
v.
W. H. Wetzel.
p. 792

Fig. 6.



WITNESSES.

C. F. Brown.

Melville Church.

INVENTOR

J. H. Garnhart.

Hill & Ellsworth

By

His Attorneys.

ing the standards of the binders' seats, by rods or otherwise, that the binders will be always kept apart and not interfere with each other in the operation of binding; and lastly, in the construction and combination of various parts, as I will now proceed to describe.

In the accompanying drawings, A is the frame of the elevator, to which the finger-bar B is attached, and C C are the fingers or guards, secured in the ordinary manner to the finger-bar. The fingers are beveled off along their sides *d*, next the standing grain, while their opposite faces *e* are straight, thereby enabling the grain to fall obliquely upon the rake-apron F, which moves over the platform and conveys the grain to the elevator G. W W are the binders' seats, and X X their standards, which are pivoted at their inner ends to the frame of the machine, as shown at *y y*. This adjustment is designed to regulate the distance of a binder from his table, so that he may perform his work to the best advantage. The seats are pivoted to the standards by a bolt on the under side of each seat passing through an eye, *z*, on the outer end of each standard. This connection allows a binder to turn his seat horizontally into such positions as shall enable him to do his work with the least fatigue or strain. If desired, the seat-standards may be permanently secured to the frame. The seats are placed above the level of the binders' tables, such being the position best calculated to afford the binders the greatest facilities for the performance of their labors with the least effort. A′ is a pin projecting from the under side of each seat, so as to extend beside the eye Z, which is cut out slightly to receive it between the shoulders *b′ b′*, as shown. By this provision the rotation of the seats is limited to a greater or less degree, according to the distance between the shoulders *b′*; and the arrangement is such that each seat shall be stopped as it fronts the binder's table, thereby forming a steady support for the binder while at work. The eye Z is formed upon a slotted plate, C′, attached to the outer end of the seat-standard by bolts passing through slots and provided with nuts on their inner ends. By this construction the plates are
794 adapted for longitudinal adjustment for the purpose of adjusting the height of the seats with respect to the binders' tables. It will thus be seen that the binders' seats have a vertical adjustment as well as the two horizontal adjustments. D′ D′ are slotted sockets attached to the inner ends of the seat-standards by bolts *e′* passing through the slots, and F′ are stirrups or foot-rests, pivoted at their inner ends to the sockets. These stirrups serve as foot-rests for the binder and enable him to more securely retain his position in the seat as the machine moves over the field, and to brace him in the seat, so that he can bind with more facility and ease. The vertical adjustment of the stirrups allows of their use by binders with different lengths of legs. G′ is a rod connecting the standards of the seats, for the purpose of keeping the binders separate, so that they shall not jostle each other in the performance of their work by being thrown together when the machine is in motion.

Having thus described my invention, what I claim is—

1. A grain-receiver made of two or more parts hinged to each other and to the elevator-frame, substantially as described, for the purpose specified.

2. A grain-receiver composed of two or more parts hinged together, the lower one of which is arranged to rest at each end upon the binders' tables, substantially as described, for the purpose specified.

3. A binder's seat, the inner end of whose standard is pivoted to the frame of the machine so as to swing laterally upon its pivot, to vary the distance horizontally of the binder's seat from the binder's table, substantially as described, for the purpose specified.

4. A swinging binder's seat pivoted to the outer end of its adjustable standard, substantially as described, for the purpose specified.

5. In combination with the pivoted binder's seat, the stop $A'$ and the shoulders $b'$ upon the eye Z, so that the binder's seat shall turn or swing upon its standard and be stopped as it fronts the binder's table, substantially as described, for the purpose specified.

6. The adjustable slotted plate $C'$, constructed with an eye, Z, as a means of connecting the binder's seat and its standard, substantially as described, for the purpose specified.

7. The binders' seats, having their pivoted swinging standards connected to each other above the pivotal points, by means of a detachable rod, substantially as described, for the purpose specified.

8. Hinged or pivoted stirrups or foot-rests on the seat-standards, substantially as described.

9. Hinged or pivoted stirrups or foot-rests made adjustable on the seat-standards, substantially as described, for the purpose specified.

10. The binders' seats, pivoted to the outer ends of their standards, made vertically and horizontally adjustable, and combined with the adjustable stirrups or foot-rests, substantially as described, for the purposes specified.

JOHN H. GARNHART.

Witnesses:

WILLIAM HABICH.

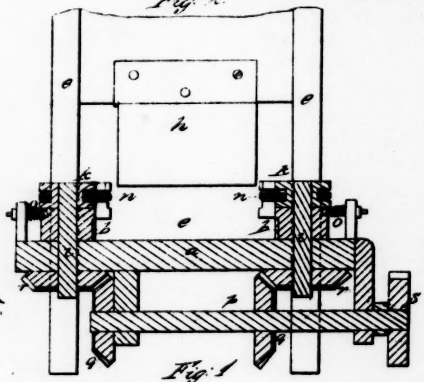
W. H. BEEKMAN.

# W. L. Williams.

## Wood Splitting Mach.

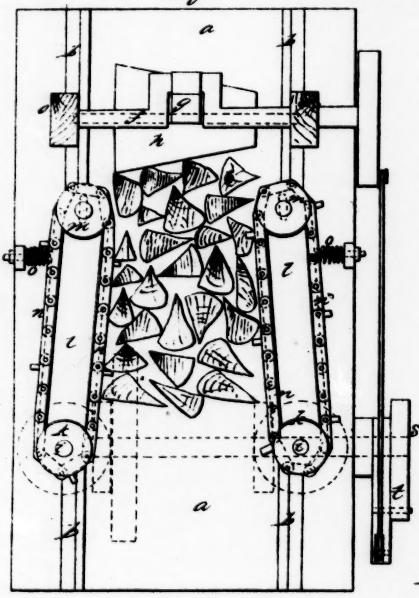
No. 89,906. Patented May 11, 1869.

Fig. 2.



No. 322.
Deering
v
W. H. W. et al.
p. 795.

Fig. 1



Witnesses:

Chas. H. Smith
Geo. D. Walker

Inventor:

Wm. L. Williams
Lemuel W. Snell
Atty

796 UNITED STATES PATENT OFFICE.

WILLIAM L. WILLIAMS, of New York, N. Y.

Letters Patent No. 89906, dated May 11, 1869.

*Improvement in Wood-splitting Machines.*

The schedule referred to in these letters patent and making part of the same.

To all whom it may concern:

Be it known that I, William L. Williams, of the city and State of New York, have invented and made a certain new and useful improvement in means for "feeding" kindling-wood-splitting machines, &c.; and I do hereby declare the following to be a full, clear, and exact description of the said invention, reference being had to the annexed drawing, making part of this specification, wherein—

(Here follows diagram marked p. 795.)

Figure 1 is a plan of the said machine.

Figure 2 is a vertical section of the same.

Similar marks of reference denote the same parts.

In machines for splitting kindling-wood, a difficulty has been experienced in feeding the wood along to the knives: this has arisen in consequence of the angular pieces becoming wedged together in the feeding trough.

To obviate this difficulty the sides of the trough have been fitted to yield, and the feeding-chain has also been made to yield. This generally prevents obstruction to the movement of the wood, but does not insure the feeding of the same when there may be only a small quantity of wood to be operated upon by the feeding-chains at any given time; hence in the splitting machines heretofore in use, the wood frequently had to be pushed forward by hand, at the risk of injury to the attendant, and irregularity of feed.

The nature of my said invention consists in the arrangement of the swinging arm to which the chain is applied, the moving end of the arm being nearest to the knives, or towards which swinging end the wood moves. The arm is kept towards the wood by a yielding pressure from a spring or weight, so as to yield to the wood when the mass is increased, or follow up in contact with the same, if the quantity is lessened, thereby insuring a continuous action upon the wood and a regularity of feed to the kindling-wood machine.

In the drawing—

*a* is the bed;

*b b*, the side pieces forming the feeding-trough;

*c*, the frame carrying the crank-shaft *f*; and

*g* is the pitman to the knives or cutters *h*.

These parts are to be of any usual or desired character.

*k* is a pulley on a vertical shaft, *i*, which shaft also forms the centre on which the arm *l* swings.

*n* is the feeding-chain carrying the dogs or feeding-hooks, and this chain passes around the pulley *k*, and also around the pulley *m*, at the moving end of the arm *l*.

The arm *l* should have offsets for the chain to run upon, and the pulley *k* be provided with spurs or recesses to cause the proper movement of the chain by the rotation of the pulley by competent power.

*o* is a spring, or it might be a weight acting to press the moving end of the arm towards the wood.

It will be evident that when two chains and arms are employed upon opposite sides of the trough, as shown, the feed of the wood will be more reliable than with only one chain. I do not, however, confine myself to the use of two.

I have represented the shaft *p*, and mitre-gears *q r*, and the ratchet-wheel *s* and pawl *t*, actuated from the shaft *f*, as the means for giving motion to the shafts *i*.

The pulley *m* should be fitted upon an adjustable gudgeon, so as to allow for tightening the feeding-chain when required.

What I claim, and desire to secure by letters patent, is—

The swinging arm *l* and pulley *k*, arranged as specified, to carry the feeding-chain for moving the wood in the trough of a wood-splitting machine, substantially as set forth.

In witness whereof, I have hereunto set my signature, this 28th day of September, A. D. 1868.

W. L. WILLIAMS.

Witnesses:

CHAS. H. SMITH.

GEO. T. PINCKNEY.

3 Sheets—Sheet 3.

# S. D. CARPENTER.

## GRAIN BINDER.

No. 85,210. Patented Dec. 22, 1868.

No. 322.
Deering
vs.
W. H. W. et al.
} p. 797

Fig: 3.

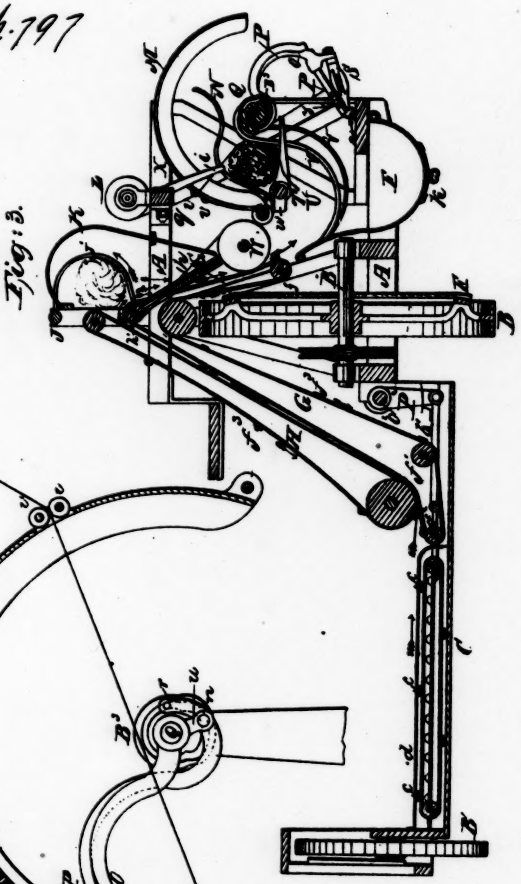
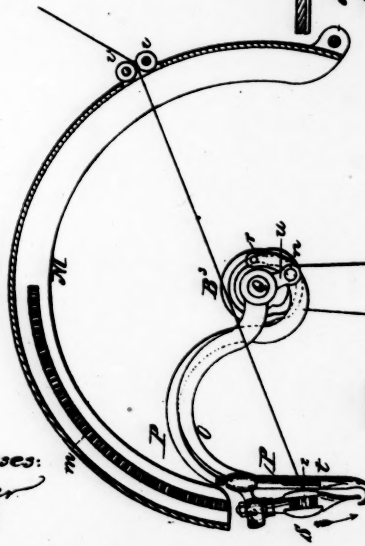


Fig: 4.



Witnesses:
L. Hauler
H. A. Dodge

Inventor
S. D. Carpenter

3 Sheets—Sheet 2.

# S. D. CARPENTER.

## GRAIN BINDER.

No. 85,210. Patented Dec. 22, 1868.

No. 322
Deering.
W. H. Weal
1,798

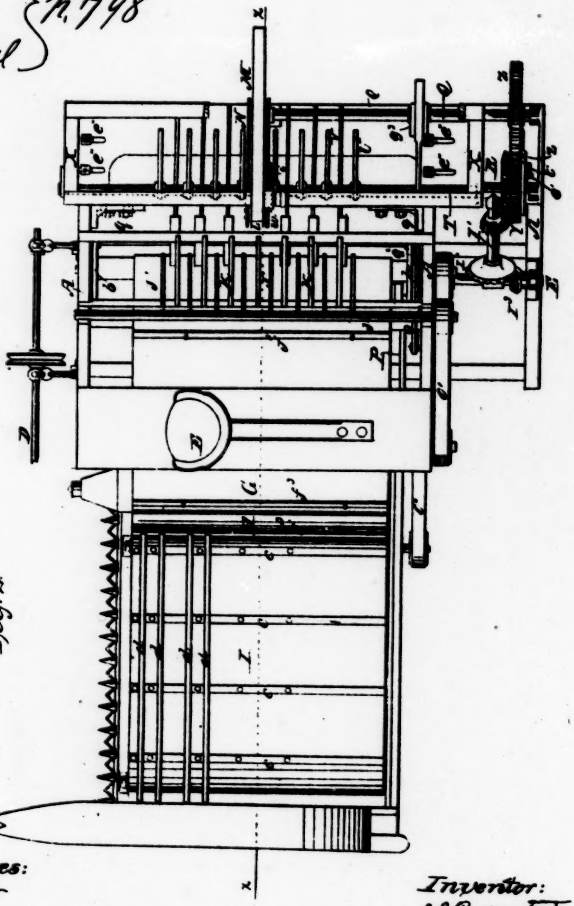


Fig. 2.

Witnesses:
L. Hailer
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Inventor:
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3 Sheets—Sheet 1.

# S. D. CARPENTER.

## GRAIN BINDER.

No. 85,210. Patented Dec. 22, 1868.

No. 322. Deering v. W. S. H. Wetal. } p. 799

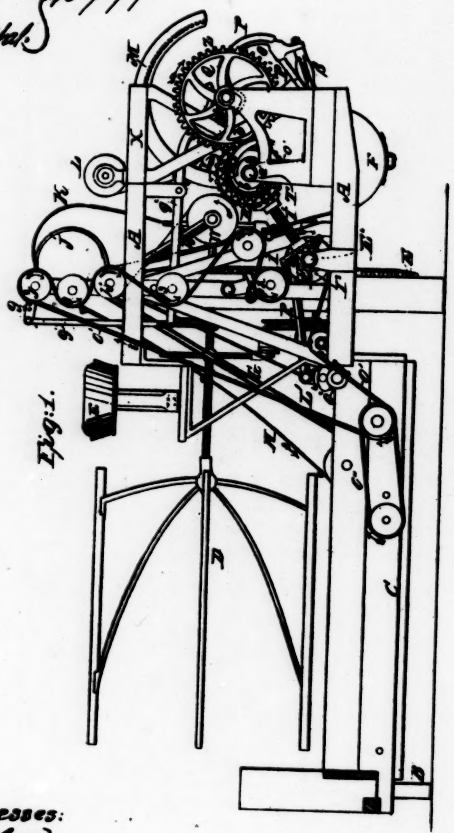


Fig: 1.

Witnesses:
L. Hailer
H. C. Dodge

Inventor:
S. D. Carpenter

800 UNITED STATES PATENT OFFICE.

S. D. CARPENTER, of Madison, Wisconsin.

*Improvement in Grain-binders.*

Specification forming part of Letters Patent No. 85210, dated December 22, 1868.

To all whom it may concern:

Be it known that I, S. D. Carpenter, of Madison, in the county of Dane and State of Wisconsin, have invented certain new and useful improvements in combined harvesting and binding machines; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making part of this specification, and to the letters of reference marked thereon, like letters indicating like parts wherever they occur.

To enable others skilled in the art to construct and use my invention, I will proceed to describe it.

My invention relates to machines for harvesting grain; and consists in certain improvements for conveying the grain from the platform to the binding mechanism, there compressing it into a bundle, and binding the same automatically; also, in providing means for catching and saving the grain that may be shelled in the process of conveying and binding it, all as hereinafter more fully described.

(Here follow diagrams marked pp. 797, 798, & 799.)

Figure 1 is a rear elevation of my improved machine. Fig. 2 is a top-plan view, and Fig. 3 is a longitudinal vertical section taken on the line *x x* of Fig. 2. Fig. 4 is a longitudinal vertical section of a portion detached and reversed.

I construct the frame A and the platform C in any suitable manner, and mount them on a single driving-wheel, B, as shown in Figs. 1 and 3, there being a wheel, B, at the outer edge of the platform for supporting it at that end. The wheel B is provided on one face with a circle of bevel-gear teeth, from which motion is imparted to the cutting, conveying, and binding mechanism, through the medium of a shaft, E″, Fig. 1, which has mounted on it, at the proper position, a bevel-gear wheel, engaging with the teeth E, this shaft carrying a bevel-gear, $I^3$, at its end. Near the back of the machine, and just inside or in front of which, is also secured a pulley, E′, which imparts motion to the belt O′, the latter, in turn, giving motion to the conveying-aprons, as shown in Fig. 1, and as hereinafter more fully explained. About the center of the main frame A is mounted a shaft, T, Figs. 1 and 3, which extends entirely across the machine, and at the edge of the frame is mounted another shaft, Q, which extends about half-way across, so as to bring

the binder-arm and band at the center of the bundles. A shaft, I′, is so located that a bevel-gear, I″, on one end engages with a bevel-gear, $I^3$, near the end of the shaft E″, and a similar gear at the opposite end of shaft I′ engages with a wheel, R, on shaft T, and thus imparts motion to the latter. On this same shaft T, by the side of wheel R, is located a spur-gear wheel, Y, which engages with a larger wheel, Z, on shaft Q, and thus imparts motion to the latter; the wheels Y and R being arranged to turn loosely on the shaft T, except when locked by a pawl, *a*, to a hub, *b*, as shown in Fig. 1, the wheels R and Y being either fastened together, or made in one piece, as preferred. The sickle is also operated from the shaft E″ by means of pitmen $P^1$, connecting at one end to a crank in said shaft, and at the opposite end to an arm, L′, secured to a rock-shaft, $O^2$, from which, at the opposite end, an arm, $P^2$, extends downward, and connects by a rod, *b*′, with the sickle, as represented in Figs. 2 and 3. Thus it will be seen that all parts of the mechanism *is* driven by the wheel B.

For the purpose of conveying the cut grain from the platform to the binder, which is located at the outer part of the frame A, I arrange on the platform an endless apron, I, which extends nearly across it, as shown in Figs. 2 and 3; this apron passing around rollers at each end, and having secured upon it, at intervals of about four inches, slats *c*, from the face of which a series of spikes or teeth project, there being a series of rods or bars, *d*, arranged above the apron, in such a manner as to support the grain and permit the spikes or teeth to project up between them, and thus take hold of the grain and carry it along as the apron moves, in the direction indicated by the arrow, Figs. 2 and 3, the rods *d* being curved eccentrically to the roller at the end where the grain is delivered, so as to carry the grain beyond the reach of the spikes in the slats, and thereby prevent the spikes from drawing the grain around under the apron, as shown in Fig. 3. Motion is imparted to this apron I by a belt, *o*″, as represented in Fig. 1.

Extending from the platform to the top of frame A are two endless aprons, G and H, the former extending up over a roller near
801 the top of the frame, and from hence down around another roller, *f*, which is located just above a series of curved bars, V, which serve as a cradle or pocket to receive and hold the grain as it is delivered by the apron G, as shown in Fig. 3. At its lower end this apron G has its under layer passing under a roller, $f^1$, and from thence extends along the platform around another roller, $f^2$, close by the end of the apron I on the platform, for the purpose of readily receiving the grain from the latter. The apron H is placed directly in front of and parallel with the main portion of the apron G, and so close to it as to bring the two so nearly in contact as to hold the grain securely between them, and thus insure its being carried up by them. In order to prevent the grain from slipping between these aprons and to keep it straight and in good order for binding, I secure upon the face of each apron a series of slats, $f^3$, the slats being arranged transversely across the aprons, as represented in Figs. 2 and 3. For the purpose of rendering them more efficient, I

arm the slats on the apron H with a series of projections in the form of staples, the rounded surfaces of which prevent their catching or tearing the adjoining apron G, and at the same time prevent their retaining a hold upon any of the grain as it is delivered at the top and passes down on the rear into the cradle.

At the top of the frame A, and in rear of the point where the aprons G and H deliver the grain, I locate a series of curved rods, K, which serve as a guard to prevent the grain from being thrown backward, and causing it to pass down upon the cradle or bars V, as shown in Figs. 1 and 3. Upon the extreme top of the frame I locate also a shaft, J, to which is attached a series of curved arms or rods, J′, which serves as a cut-off to stop the flow of the grain into the cradle while the quantity therein is being removed by the rake-teeth U, as hereinafter explained. The shaft J has an arm, $g$, which is connected by a rod, $g^1$, to a lever, $g^2$, the rear end of which rests upon and is actuated by a cam, $g^3$, mounted on the binder-shaft Q, as shown in Fig. 1, this cam $g^3$ being of such a form, and so located on the shaft, as to raise the cut-off or rods J′, and hold them up about one-half of the time, long enough to permit a sufficient quantity of grain to pass down into the cradle to form a bundle of the required size.

Directly in rear of the rear portion of apron G is placed a shaft having a series of rollers, W, secured thereon at proper intervals, to permit the teeth of rake U to pass between them, the shaft being suspended by arms $h$, loosely from the journals of the pulley $h'$, over which the upper portion of apron G passes, as shown in Fig. 3, the rollers W thus swinging loosely, and resting against the rear face of apron G and serving to assist in separating and conveying the grain down into the cradle, and prevent the straw from becoming disarranged or crossed, and at the same time preventing it from being thrown upon the binding mechanism. The rollers W are driven by a cross-belt from roller $h'$, as shown in Fig. 3.

Upon the shaft T, which is located about midway between the rear end of apron G and the binder-shaft Q, I secure a set of arms, U, which thus form a revolving rake, the function of which is to sweep the grain from the cradle around under the shaft T, and up to the position indicated in Fig. 3, where it is held while the wire is passed around it. In order to compress the grain into a bundle, the central bars V′ of the cradle are raised somewhat above the others, as shown in Fig. 3; and above the bundle is located a compressor, N, which consists of two or more bent rods, pivoted to the end of a curved frame, M, and held down by a spring arm or pawl, $i$, which is released at the proper time by the shuttle-arm, as will be hereinafter explained.

The wire, which is fed from a spool, L, is carried around the bundle (while the bundle is held between the teeth U of the rotating rake and the compressor N) by means of a curved arm, O, secured upon and rotating with the shaft Q, as represented in Fig. 3. This binder-arm O carries at its outer end a shuttle, S, of peculiar construction, for twisting, cutting off, and holding the wire, which shuttle, together with the spool L, will form the subject of a separate

application for a patent, and therefore need not be herein specially described.

The shaft Q, with the binder-arm, is constantly revolving, while the rake-shaft T revolves only at intervals, remaining stationary in the position shown in Fig. 3 one-half of the time. These relative motions are produced by the following means:

As previously described, the wheels R Y turn loosely upon the shaft T, except when locked thereto by means of the pawl *a* and collar *b*, as shown in Fig. 1. As they are constantly in motion, and gear into the wheel Z on shaft Q, it follows that the latter has imparted to it a continuous motion. On the wheel Z is a cam, *l*, which, when the wheel brings it around to the proper position, strikes against the free end of the lever-pawl *a*, and thereby disengages it from the notch in the collar *b*, which permits the wheels R Y to turn loosely on the shaft T, while the latter remains stationary, thus holding the teeth U in the position shown in Fig. 3, and where they remain, as previously stated, while the wire is wound around the bundles and until the wheels R Y have made one revolution, at which time the wheel Z, which is double the diameter of the others, will have made a half-revolution, thus carrying the cam Z over to the opposite side, which leaves the pawl *a* free to engage with the collar *b* again, and thereby start the rake again. As represented in Fig. 1, there is a spring-arm, *c'*, standing vertically by the side of collar *b*, with a notch or recess in its face, in
802 which a pin, *c'*, on the collar engages when the pawl *a* is released, this spring-arm thus serving to hold the rake in the position shown in Fig. 3, while the bundle rests thereon.

The binder-arm O is secured rigidly to the shaft Q, and, as shown in Fig. 4, has a short arm, *n*, projecting from the opposite side of the shaft; and to this short arm is pivoted at *n*, another curved arm, P, to the side of which, at its rear end, is secured a pin, *r*, which works in a cam-groove in the adjoining face of a stationary plate, $B^3$. Near the front end of the binder-arm O, and alongside of the shuttle S, is attached a tube, $P^1$, and in this tube is a flexible rod, having its upper end jointed to the arm P, while its other end bent so as to protrude through a slot in the side of the tube $P^1$, where it terminates in a pointed hook, *t*, which has a shoulder on its upper and outward face. With these parts thus constructed and arranged, it follows that when the shaft Q has revolved far enough to bring the shuttle S around opposite the rollers *v*, where the wire enters the frame M, and at which time the shuttle will take hold upon the wire again, after having carried its end around the bundle, the offset in the cam-groove, operating on the short end of arm P through the medium of pin *r*, will cause its opposite end to recede from arm *o*, thereby drawing up the hook *t*, over the shoulder of which the wire will have slipped, and thus draw the loose portion of the wire up into the slot in the shuttle to the center of the twister Z, where it is held while being twisted, as will be more fully explained in my specification relating to the shuttle proper, to be hereafter filed.

A semicircular frame, M, is located directly over the shat Q, in

such a position as that when the binder-arm O revolves, the shuttle S will travel in this frame, which is recessed for that purpose, it forming about one-half of the circle described by the shuttle in its revolution, as represented in Fig. 4. The shuttle carries within it a circular, twisting, and cutting device, Z, which has on its periphery teeth that protrude through openings on each side of the shuttle, and on the inner face of the side of the frame M, next to the shaft Q, is arranged a rack, *m*, by which the twister Z is made to rotate as the shuttle passes along through that portion of the frame or race M, the rack *m* being of such a length as to give four revolutions to the twister.

As previously stated, the shaft Q extends only about half-way across the frame A, and the binder-arm O is secured upon its extreme end, directly under the frame or race M, to permit the wire to be carried past the end of shaft Q as it is wound around the bundle, and the end of arm O is beveled to prevent the wire from being caught thereon, and insure its passing on the free side of the arm O as the end of said arm passes by the wire where it enters the race or frame M. The shuttle S is swiveled on the end of the binder-arm O, so as to turn freely thereon, so that as soon as the shuttle leaves the race the tension of the wire from the spool pulls the shuttle over, causing it to make a half-revolution, and thereby assist in bringing the wire on the free side of the binder-arm.

Underneath the binding apparatus I locate a receptacle, F, for catching and saving the heads and shelled grain, there being an opening in the bottom, closed by a slide, *k*, for removing it when necessary.

The pulleys 1, 2, 3, and 4 are loose pulleys, used simply to give to the belt the proper direction and sufficient bearing on the other pulleys. One of these pulleys, 2, is hung on a swinging or pivoted arm, *s*, which has a slot in it, through which a set-screw passes, and by which the position of the arm and its pulley 2 may be adjusted, so as to tighten up the belt O′, as may be necessary.

The speed of the binding mechanism may be changed at any time by simply replacing the bevel-gear I³ by another of a different size, either larger or smaller, and then adjusting the gear-wheel I″ on the shaft I′ to correspond. When the grain is heavy or thick on the ground the speed will need to be increased, and when light or thin the speed should be decreased—the speed of the sickle remaining the same in each case.

It will be observed that the frame X of the binder is made separate, and attached to the frame A by means of slotted corner pieces *q* at the top, and by slats *r*″ in its bottom piece, as shown in Figs. 1 and 3, to permit the binder to be adjusted forward or backward on the machine, so as to always bring the binder-arm and wire at the center of the bundle, whether the grain be long or short.

The shaft T has a bend or crank at its center, opposite the point of frame or race M, as shown in Fig. 3, and also in dotted lines in Fig. 2, this bend being for the purpose of furnishing room for the end of the binder-arm with the shuttle to pass through, and at the same time permit the shafts T and Q to be brought nearer together,

and thereby reduce the size of the wheels necessary to be used thereon.

The binder-arm, as it passes the rollers *v*, where the wire enters the frame or race M, (the loose part of the wire having been received by the hook *t*,) at the same time releases the spring-arm *i* from its hold on the compressor N, thereby allowing the latter to rise, as the bundle is pressed up against it by the binder-arm, which carries the bundle up over the shaft Q, and drops it out behind on the ground. The compressor N is also intended to prevent the straw from rising so as to force the wire too high to be received by the hook *t*, as the line of the wire should not go above a line drawn from center of shaft 2 to center between rollers *v v*, before the hook *t* has received the loose end of the wire; and it may also serve to prevent the straw from getting into the race, where it would interfere
803 with the movements of the shuttle, or with the twister Z, by catching in the teeth and preventing it from rotating. Thus I am enabled to produce a complete working machine, which shall perform all the labor of cutting, conveying, compressing, and binding the grain into bundles, and then delivering it from the machine with no other help than that of the driver.

The operation will be readily understood from the foregoing description by any one familiar with this class of machines.

Having thus described my invention, what I claim as new, and desire to secure by letters patent, is—

1. The combination, in a grain-cutting and binding machine, of the horizontal apron I, with its guards or rods *d*, the inclined aprons G and H, the cut-off J′, the revolving rake U, and the rotating binder-arm O, all constructed and arranged to operate substantially as and for the purpose herein described.

2. The slats $f^3$, with the staples, or equivalent devices, applied to the apron H, as shown and described.

3. The revolving rake, when arranged to move at stated intervals, substantially as described, for the purpose of sweeping the grain from the cradle, and holding it under the compressor while being bound.

4. A rotating binder-arm, constructed and arranged to operate substantially as described, for carrying the band around the bundle, and then removing the bundle, as set forth.

5. The combination of the arm P, having the sliding hook *t* attached, and the cam $B^3$, when constructed and arranged to operate substantially as described, for the purpose of drawing the wire to the center of the twister, to insure the operation of the latter, as set forth.

6. The shuttle-race or frame M, provided with the rack *m*, when arranged in relation to the binder-arm, substantially as described.

7. The receptacle F, located under the binding mechanism, for receiving and saving the grain, as herein described.

8 The compressor N, constructed and arranged to operate as and for the purpose set forth.

9. The cut-off consisting of the rock-shaft J, provided with the curved arms J′, arranged to be operated by means of the cam $g^3$ on

the binder-shaft Q, through the medium of the levers $g^2$, rod $g^1$, and arm $g$, substantially as described.

10. The swinging rollers W, arranged to operate in connection with the apron G, as set forth.

11. Changing the speed of the binder, independently of the cutting or carrying mechanism, by means of gear-wheels I'', of varying sizes, applied to the shaft E'', as herein described.

12. The combination of the wheel Y, carrying the pivoted pawl $a$, the notched collar $b$, and wheel Z, with its cam $l$, when arranged to operate as and for the purpose set forth.

S. D. CARPENTER.

Witnesses:
P. T. DODGE.
L. HAILER.

805 UNITED STATES PATENT OFFICE.

JACOB SEIBEL, of Manlius, Illinois.

*Improvement in Harvesters.*

Specification forming part of Letters Patent No. 45642, dated December 27, 1864.

To all whom it may concern:

Be it known that I, Jacob Seibel, of Manlius, in the county of Bureau and State of Illinois, have invented a new and useful improvement in harvesters; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings and the letters and figures marked thereon, which form part of this specification.

In said drawings, figure 1 represents a plan or top view of my invention. Fig. 2 is a vertical section at the line *x* in Fig. 1; and Fig. 3 represents an end view of the machine at W in Fig. 2.

(Here follows diagram marked p. 804.)

Similar letters of reference in the different figures represent corresponding parts of my invention.

The nature of my invention consists in a novel arrangement for raising and adjusting the sickle at different heights from the ground, whereby the said adjustment is readily and easily accomplished.

To enable those skilled in the art to construct and make use of my invention, I will proceed to describe the same with particularity.

A and B represent the two large wheels, by which the power is imparted to the various parts of the machine, A, which propels the sickle, being provided with ribs upon the face of the wheel for the purpose of giving it greater propelling-power.

C C represent that part of the frame which is supported mainly upon the drive-wheels A B.

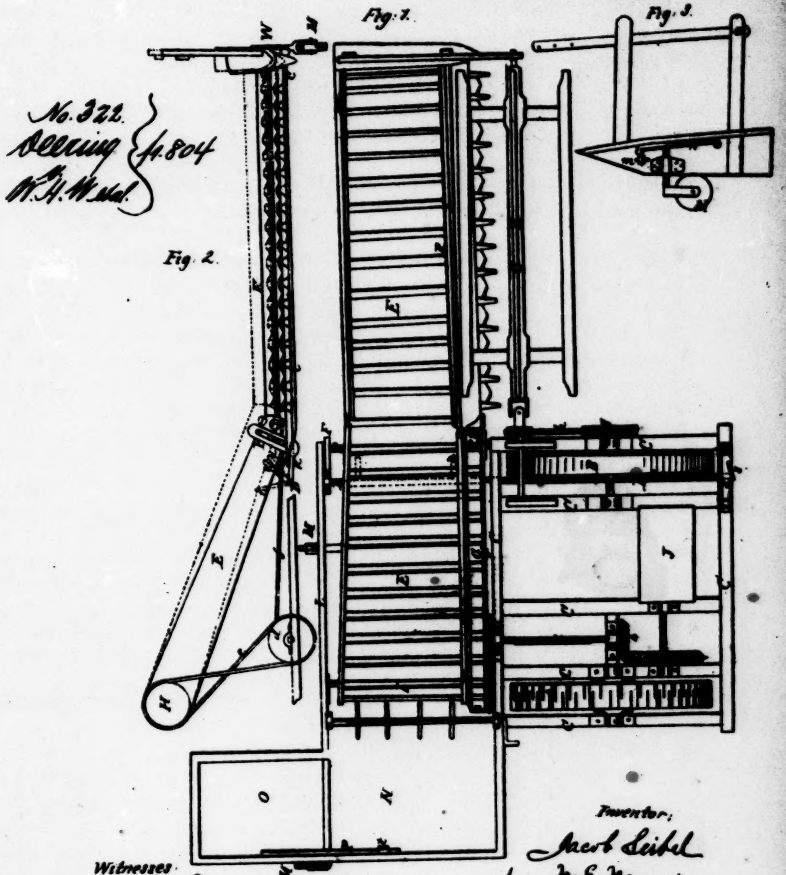
Upon the interior of the rim of the wheel A is a cogged gear, into which a pinion upon the shaft of the wheel *a* fits, thus, by means of the bevel-gear upon the wheels *a b* and the shaft *c*, revolving the pitman-wheel *d*, and by means of the pitman *f* driving the sickle. The same drive-wheel A, by means of the cord E, passing around the pitman-wheel *d*, and the drum-wheel H, in connection with the before-described intermediate gearing, operates the endless apron or elevator E. The shaft of the wheel B revolves with the wheel, and by means of the wheel *g* and the cord or belt *h* operates the reel R.

N O represent a box or compartment of the machine, in which the grain is deposited and bound by persons standing therein. After being bound into bundles the bundles are deposited upon the trap O, and when enough have accumulated to make a shock it is

# J. Seibel.

## Harvester Droppers.

No. 45642 Patented Dec. 27, 1864




Witnesses:
P. H. Brown
L. L. Osburn

Inventor;
Jacob Seibel
by W. E. Newell
his attorney.

precipitated upon the ground by detaching the spring-catch *t* from the lever or arm P.

The frame K, lying immediately back of the sickle, and the top of the endless apron E are raised above the plane of the sickle, so that as the grain is cut and drops upon said apron the ends will not come in contact with the sickle, whose action and rapid motion would derange the position of the grain upon the apron, thereby keeping the grain as even and facilitating the binding as much as possible.

L is a part of the frame projecting from the part O, and serves to support the apron E.

M represents truck-wheels, which support the machine in connection with the two wheels A B, before mentioned.

Immediately contiguous to the wheel H, around which the belt or cord *e* passes, and fixed upon the same shaft or roller, I, which revolves the endless apron, is the drum-wheel T, which must be greater in diameter than said roller I, for the reasons hereinafter mentioned. At the point where the endless apron begins to incline upward there is fitted upon the supporting-bar P another drum-wheel, which revolves upon the bar *p* aforesaid, said wheel being marked *r*.

Passing around the two drum-wheels T and *n* is a narrow belt or band, G, which lies parallel to the inclined part of E, and is provided with similar buckets or projections for carrying up the grain. As both the endless apron E and the belt G are driven by the band *e*, and as the drum T is of greater diameter than the roller I, it follows that the belt G will travel up the incline somewhat faster than the apron E. The advantages of this arrangement are as follows: It is well known that in harvesters generally the grain, being heavier at the butt-end, and being also retarded in its passage along the apron by the action of the sickle upon the same, has a tendency to move up the incline of the apron obliquely, the heavier end toward the front of the harvester being lower down upon the apron than the opposite end. Thus the grain, in dropping from the upper end of the apron into the binder, instead of being deposited in a parallel and even manner, is thrown into a confused heap, which cannot be bound properly, nor, in fact, in any way, except with great difficulty and delay. Now, by means of my invention, this difficulty is obviated, for in the first place the endless apron is situated
806 so far above the plane of the sickle that the ends of the straw are not retarded thereby; and, secondly, and especially since the ends of the grain must rest upon the belt G, its more rapid motion will compensate entirely for the tendency of the heavier end to drag behind, and thus the grain will drop evenly and properly from the apron, and can be bound readily, easily, and rapidly.

F F represent two slotted blocks, in which the ends of the bar *p* supporting the endless apron E rest. The object of the slotted supports is to enable the apron to be raised up from the ground, as hereinafter described, the bar *p* sliding up in said slots.

D represents a shaft passing through the machine, beneath the frame of the endless apron, supported in suitable bearings, so as to

allow a rotating motion of said shaft D. To the front end of said shaft is rigidly attached an upright handle or lever, *s*, which is operated by the driver upon the seat J moving the lever as desired, and retaining it in any required position by means of the toothed bar *s'*. The said motion of the lever *s* imparts a reciprocating rotating motion to the shaft. Directly beneath the endless apron this shaft is provided with the arms *k k*, arranged substantially as shown, so that when the shaft is rotated toward the driver the said arms press against the endless apron and raise the same up from the ground, the bar *p* sliding in the slots F F, as shown by the red lines in Fig. 2. Just in front of the frame of the endless apron the shaft D is also provided with the arm *i*, which contains several small holes. Into one of these holes is hooked a rod, *l*, that passes laterally beneath the sickle-bar, as shown. Near the outer end of the sickle-bar a small chain, *l'*, is fastened to said rod *l*, which chain passes about a pulley, *m*, and is attached to the end of the spring *n*, as seen in Fig. 3.

The truck-wheel M' is attached to the sliding rod *o*, as shown, so that when the spring *n* is drawn down by the tension upon the rod *l* and chain *l'* the end of the machine is thereby raised from the ground and kept at the same height as the opposite end of the sickle-bar. The revolution of the shaft D by means of the arms *k* and *i* and the rod *l* and chain *l'* simultaneously elevates or lowers the sickle and the endless apron, keeping the same parallel with the ground.

Having described my improvement in harvesters, I will now proceed to point out specifically what I claim as new therein and desire to secure by letters patent—

1. The combination of the shaft D, provided with the arms *i k*, the rod *l*, chain *l'*, and spring *n*, all arranged and operating substantially as and for the purposes specified and shown.

2. The arrangement, in combination with the above, of the frame carrying the endless apron E and auxiliary belt G, substantially as and for the purposes herein set forth and shown.

JACOB SEIBEL.

Witnesses:
W. E. MARRS.
L. L. COBURN.

C.W. & W.W. Marsh,
Harvester Rake.

No 41080

Patented. Jan. 5. 1864

No. 322
Deering
v
W.H.W. et al
p. 807

Fig. 1.

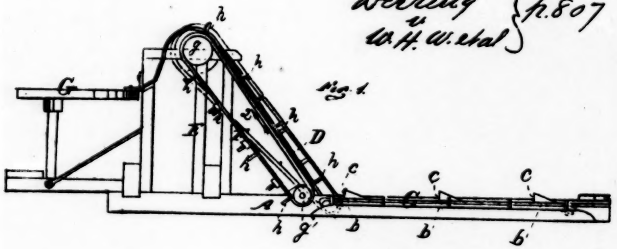
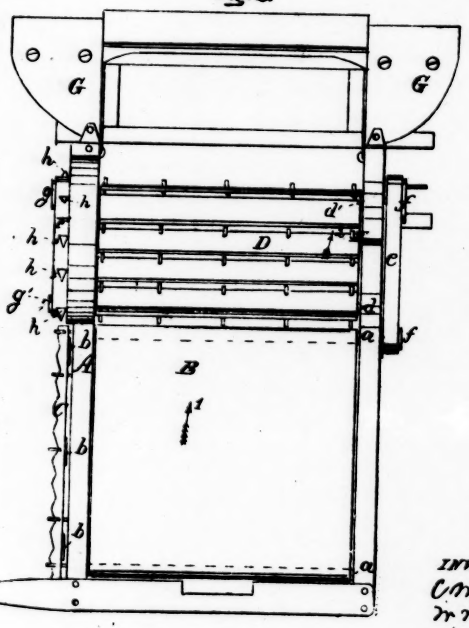



Fig. 2.

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808 UNITED STATES PATENT OFFICE.

C. W. MARSH and W. W. MARSH, of Shabbona, Illinois.

*Improvement in Raking Devices for Harvesters.*

Specification forming part of Letters Patent No. 41080, dated January 5, 1864.

To all whom it may concern:

Be it known that we, C. W. Marsh and W. W. Marsh, of Shabbona, in the county of De Kalb and State of Illinois, have invented a new and improved raking device for harvesters; and we do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

(Here follows diagram marked p. 807.)

Figure 1 is a front view of the frame of a harvester having our invention applied to it; Fig. 2, a plan or top view of the same.

Similar letters of reference indicate corresponding parts in the two figures.

To enable those skilled in the art to fully understand and construct our invention, we will proceed to describe it.

A represents a horizontal rectangular frame, in which a horizontal band, B, is placed, and fitted over rollers *a a*. This band B extends the whole width of the frame A, and moves in the direction indicated by the arrow 1.

C represents the sickle, which may be of the ordinary reciprocating kind, and works at the front of the frame A. This sickle has a series of upright ribs or projections, *b*, attached to its back part, the upper edges of said ribs or projections being inclined, so as to leave a vertical face, *c*, at one end, as shown clearly in Fig. 1, the upper edges of the ribs extending at one end down to the sickle C.

D represents an endless toothed apron, or it may be termed an "endless band of rakes." This toothed apron has an inclined position, and it works over rollers *d d'*, one of which, *d*, has its bearings in the frame A, and the other, *d'*, its bearings in an upright frame, E, attached to the frame A. The toothed apron D moves in the direction indicated by the arrow 2, and the apron D and band B are moved by power applied to the upper roller, *a'*, of the apron D, motion being communicated from the roller *d'* to one of the rollers *a* of the apron by a belt, *e*. The pulleys *f f'*, over which the belt *e* passes, are of different diameters, the pulley *f* or the roller *d'* being of larger diameter than the pulley *f'* of the roller *a*. Hence it will be seen that the band B will move quicker than the toothed apron D.

F is a belt, which passes around pulleys *g g'* at the ends of the rollers *d' a*, which are opposite to the ends on which the pulleys *f f'*

are placed. This belt F is provided with teeth *h* at suitable and equal distances apart.

The operation is as follows: As the harvester is drawn along the grain is cut by the sickle C and falls upon the band B the butts of course being at the front part of the band B. The band B, by its movement, conveys the cut grain to the toothed apron D; but the grain will not fall evenly, so that the straws will be perfectly parallel with each other on the band B. It will fall more or less obliquely, according to the position in which it may stand when cut. The grain or straw is brought at right angles with the band B by two different means, one being the ribs or projections *b*, which, as the sickle C moves in the direction indicated by arrow 1, catch the straw and shove it forward in the direction the band B is moving, and, during the return movement of the sickle, slip under the straw and catch it again at their vertical faces or sides *c*, when the movement of the sickle changes. The other means for straightening the grain or bringing the straw parallel consists in the difference of speed between the band B and the toothed apron D. In consequence of the former having rather a quicker movement than the latter, the grain will be straightened or brought at right angles to the band B at the lower part of the toothed apron D, so that the grain will ascend or be carried up by the toothed apron D in a horizontal position. While the grain is being carried up by the toothed apron D the toothed belt F holds the butts of the stalks, preventing them from lagging or falling. Thus it will be seen that the grain will be discharged from the upper end of the toothed apron D with the straws all parallel with the latter, and the grain consequently can be taken from the box or receptacle into which it is discharged from D in an even state, so that it may be bound with facility.

G G are the binders' tables, secured to the frame A.

The receptacle into which the grain is discharged (not represented) may be just below the upper part of the toothed apron D.

809 Having thus described our invention, what we claim as new, and desire to secure by letters patent, is—

1. Providing the sickle C with ribs or projections *b* when the latter are used in combination with the endless band B and toothed apron D, for the purpose specified.

2. The toothed belt F, in combination with the toothed apron D and endless band B, as and for the purpose set forth.

C. W. MARSH.
W. W. MARSH.

Witnesses:
SAMUEL MARSH.
OCTAVIUS KNIGHT.

are placed. This belt F is provided with teeth *h* at suitable and equal distances apart.

The operation is as follows: As the harvester is drawn along the grain is cut by the sickle C and falls upon the band B the butts of course being at the front part of the band B. The band B, by its movement, conveys the cut grain to the toothed apron D; but the grain will not fall evenly, so that the straws will be perfectly parallel with each other on the band B. It will fall more or less obliquely, according to the position in which it may stand when cut. The grain or straw is brought at right angles with the band B by two different means, one being the ribs or projections *b*, which, as the sickle C moves in the direction indicated by arrow 1, catch the straw and shove it forward in the direction the band B is moving, and, during the return movement of the sickle, slip under the straw and catch it again at their vertical faces or sides *c*, when the movement of the sickle changes. The other means for straightening the grain or bringing the straw parallel consists in the difference of speed between the band B and the toothed apron D. In consequence of the former having rather a quicker movement than the latter, the grain will be straightened or brought at right angles to the band B at the lower part of the toothed apron D, so that the grain will ascend or be carried up by the toothed apron D in a horizontal position. While the grain is being carried up by the toothed apron D the toothed belt F holds the butts of the stalks, preventing them from lagging or falling. Thus it will be seen that the grain will be discharged from the upper end of the toothed apron D with the straws all parallel with the latter, and the grain consequently can be taken from the box or receptacle into which it is discharged from D in an even state, so that it may be bound with facility.

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The receptacle into which the grain is discharged (not represented) may be just below the upper part of the toothed apron D.

809 Having thus described our invention, what we claim as new, and desire to secure by letters patent, is—

1. Providing the sickle C with ribs or projections *b* when the latter are used in combination with the endless band B and toothed apron D, for the purpose specified.

2. The toothed belt F, in combination with the toothed apron D and endless band B, as and for the purpose set forth.

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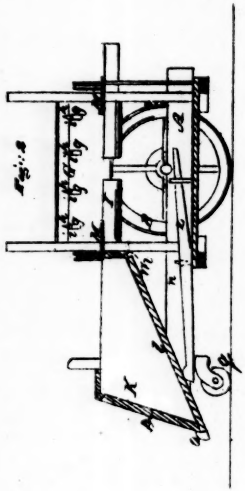
Witnesses:
SAMUEL MARSH.
OCTAVIUS KNIGHT.

C. Wand. W. W. Marsh.

Harvester Rake.

No. 21207

Patented Aug. 17, 1858.



No. 322.
Deering
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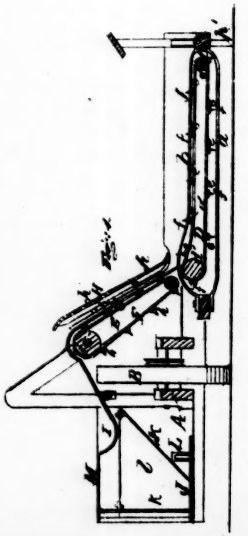
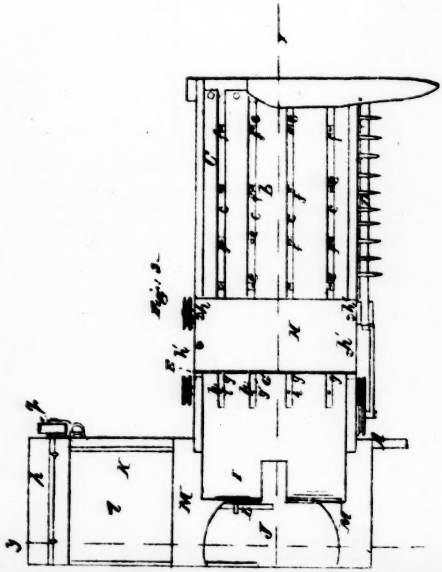
} H. 810





811 UNITED STATES PATENT OFFICE.

C. W. MARSH and W. W. MARSH, of Shabbona, Illinois.

*Improvement in Reaping-machines.*

Specification forming part of Letters Patent No. 21207, dated August 17, 1858.

To all whom it may concern:

Be it known that we, C. W. Marsh and W. W. Marsh, of Shabbona, in the county of De Kalb and State of Illinois, have invented a new and useful improvement in reaping-machines; and we do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawings, making a part of this specification, in which—

(Here follows diagram marked p. 810.)

Figure 1 is a longitudinal vertical section of our invention, taken in the line *x x*, Fig. 3. Fig. 2 is a transverse vertical section of the same, taken in the line *y y*, Fig. 3. Fig. 3 is a plan or top view of the same.

Similar letters of reference indicate corresponding parts in the several figures.

This invention relates to an improved arrangement of parts applied to a reaping-machine for the purpose of gathering the grain as it is cut into proper-sized gavels, and enabling attendants to bind the same with facility into sheaves, and allow the sheaves to be discharged from the machine in piles for the convenience of gathering or harvesting them.

To enable those skilled in the art to fully understand and construct our invention, we will proceed to describe it.

A represents the main frame of a reaper. B is the driving-wheel, and C is the platform attached to the main frame. At the front edge of the platform C a reciprocating sickle, D, is placed. This sickle may be arranged in the usual or in any proper way and be operated from the driving-wheel B by any suitable driving device.

The platform C is constructed of a rectangular frame, having a close bottom, *a*, and a top, *b*, which is slotted or grooved longitudinally, as shown at *c*, Fig. 3, said grooves extending the whole length of the platform. (See Fig. 3.)

On the platform C, between the bottom *a* and top *b*, an endless band of rakes, D, is placed. This endless band of rakes is formed of straps *d d*, which pass around rollers *d' d'* on the platform, one at each end, said straps having bars *e* attached to them, the bars being provided with teeth *f*, which project through the slots or grooves *c* as the bars pass over the upper parts of the rollers and traverse the distance between them.

To the inner side of the platform C an inclined frame, E, is at-

tached, having an endless band of rakes, F, placed within it. The band of rakes F is precisely similar to the band of rakes D, the former having the same inclination as the frame E. The frame E has a plate or board, G, fitted in it, grooved to correspond with the top *b* of the platform C, as shown at *g*, and the teeth *h* of the bars *i* of the band F project through the grooves *g*.

H is a board or plate, which is fitted over the inclined frame E and on pins *h'*, the board or plate being allowed to slide on said pins. (See more particularly Fig. 1.) The plate or board H extends over the upper roller, *j*, of the band F, and terminates in a box or receptacle, I, the length of which may be about equal, or it may slightly exceed the width of platform C and frame E. The box or receptacle I projects over the side of the main frame A, and is partially supported by braces *k* from a platform, J, which is at the outer side of the main frame A, and in the same plane with the platform C. The platform J is the binders' platform for the attendants. Two or more stand on said platform and bind the grain, as will be presently described, the distance between the box or receptacle I and the platform J being such that the box or receptacle will be at a convenient height for the manual operation of binding.

To the back end of the platform J and the parts connected therewith a box, K, is attached. This box has an inclined bottom, *l*, which is hinged at its inner and elevated end, as shown at *m*. The bottom *l* rests on a lever, L, which has its fulcrum at *n* at the back end of the platform J, and the outer end of the bottom *l* is provided with a shoulder, *o*, which, when the inner end of lever L is depressed, catches over the lower end of the end piece, *p*, of the box K, said end piece being hinged at its upper end.

At each side of the box or receptacle I a small platform, M, is placed. (See Fig. 3.) The outer end of platform C is supported by a wheel, *p'*, and the back end of platform J is supported by a caster-wheel, *q*.

The operation is as follows: As the machine is drawn along the cut grain falls, as usual, on the platform, the ordinary reel being used, and the two endless bands of rakes are operated from the driving-wheel B by any proper means. The cut grain is carried by the band D to the bar E, and the latter carries it up behind
812 the plate or board H into the box I, the plate or board protecting the grain from the wind, and at the same time keeping it on the teeth *h* and yielding or giving, as circumstances may require. Two or more attendants stand on the platform J and bind the grain into sheaves, the grain being encompassed by the bands in the box I and removed therefrom and the bands twisted on the platforms M M. The sheaves are thrown into the box K, and when it contains a certain number one of the operators, who keeps the end of lever L depressed by his foot, removes his foot therefrom, and the bottom *l* and end piece, *p*, open and the sheaves are discharged by their own gravity in a pile on the ground, thereby facilitating the gathering or harvesting of the same.

We are aware that endless bands of rakes have been previously

used for conveying cut grain from the platform of reapers, and we do not claim separately and broadly such device; but

We claim as new and desire to secure by letters patent—

The box or receptacle I, platforms J M M, and box K, provided with the hinged or adjustable bottom and end piece, *l p*, when the above parts are used in connection with the endless bands of rakes D E, and arranged relatively with each other substantially as and for the purpose specified.

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W. W. MARSH.

Witnesses:
R. B. WARREN.
SAMUEL MARSH.

827 UNITED STATES PATENT OFFICE.

PETER H. WATSON and EDWARD S. RENWICK, of Washington, D. C.

*Improvement in Grain Harvesters and Binders.*

Specification forming part of Letters Patent No. 9,930, dated December 6, 1853; antedated June 6, 1853.

To all whom it may concern:

Be it known that we, Peter H. Watson and Edward S. Renwick, of Washington, in the District of Columbia, have invented certain new and useful improvements in harvesting machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which make part of this specification, and in which—

(Here follow diagrams marked pp. 813 to 826 incl.)

Figure 1 represents a view in perspective of one modification of our machine as arranged for cutting grain and binding the same into sheaves. Fig. 2 is a plan of the same. Fig. 3 is a vertical longitudinal section of the machine at the line *x x* of Fig. 2, looking toward the front of the machine. Fig. 4 is an elevation of the left end of the machine, or that farthest from the standing grain when the machine is in operation. Fig. 5 is a vertical transverse section at the line * * of Fig. 2, looking toward the right end of the machine, or that next the standing grain. Fig. 6ª is a transverse section of the sickle on an enlarged scale. Fig. 7 is a top view of the forceps and other instruments which act upon the cord and of the cams upon their shaft, all mounted in the frame of the binding mechanism. Fig. 8 is an elevation of the tying forceps and of the cam, &c., by which they are operated. Fig. 9 is a cross-section, and Fig. 10 is a side elevation, of a portion of the binding mechanism, showing the knife for severing the binding-cord and the mechanism for actuating the same. Fig. 11 is a cross-section of a portion of the binding mechanism, showing the cord-nippers and the mechanism for opening the same. Fig. 12 is a longitudinal section of a portion of the binding mechanism and of the compressor, showing a view of the cord-nippers, and the mechanism for actuating them, at right angles to the view shown in Fig. 11. Fig. 13 is a face view of the nippers, showing the manner in which the springs act upon the shanks to close the jaws. Fig. 14 is a horizontal section at the line *x x* of Fig. 12, showing the relative position of the wedge for entering between the shanks of the nippers to open the jaws thereof, the shanks of the nippers, and the nipper-stock. Fig. 15 is a cross-section of a portion of the binding mechanism, showing the finger for pushing the ends of the cord through the loop in tying the knot and the mechanism for operating the same. Fig. 16

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# Watson & Renwick.

## Harvester & Binder.

No 9930

Patented Dec. 6. 1853
Antedated June 6. 1853

No. 322.
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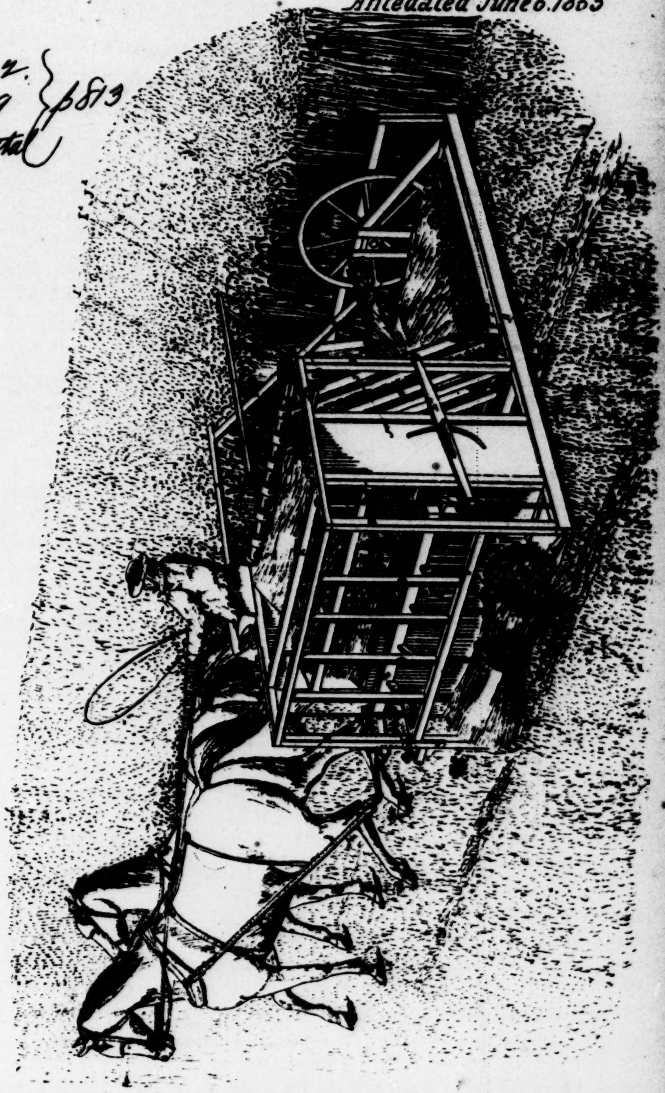
v.
W. H. Wetal
p 813



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Deering
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# Watson & Renwick

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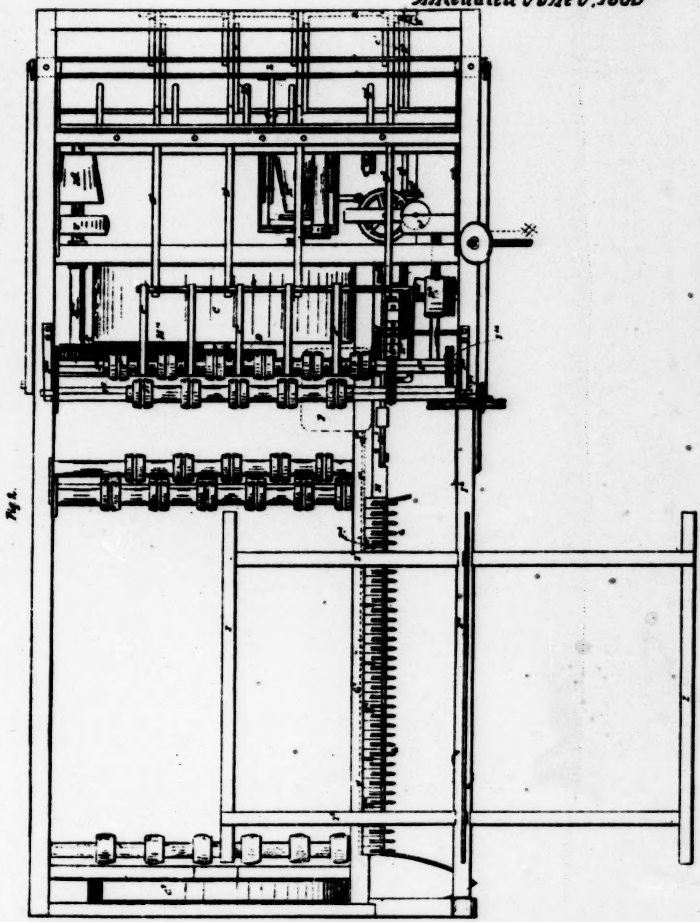

Fig. 2.

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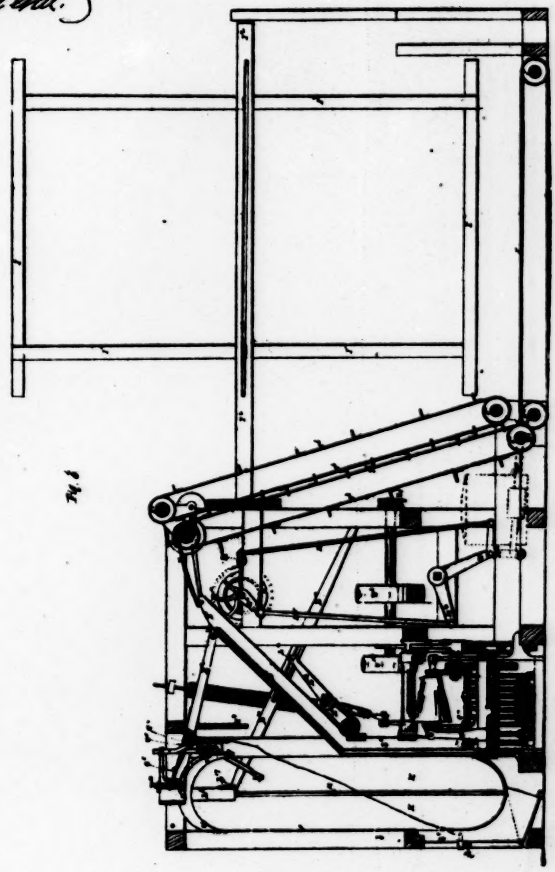

Fig. 1

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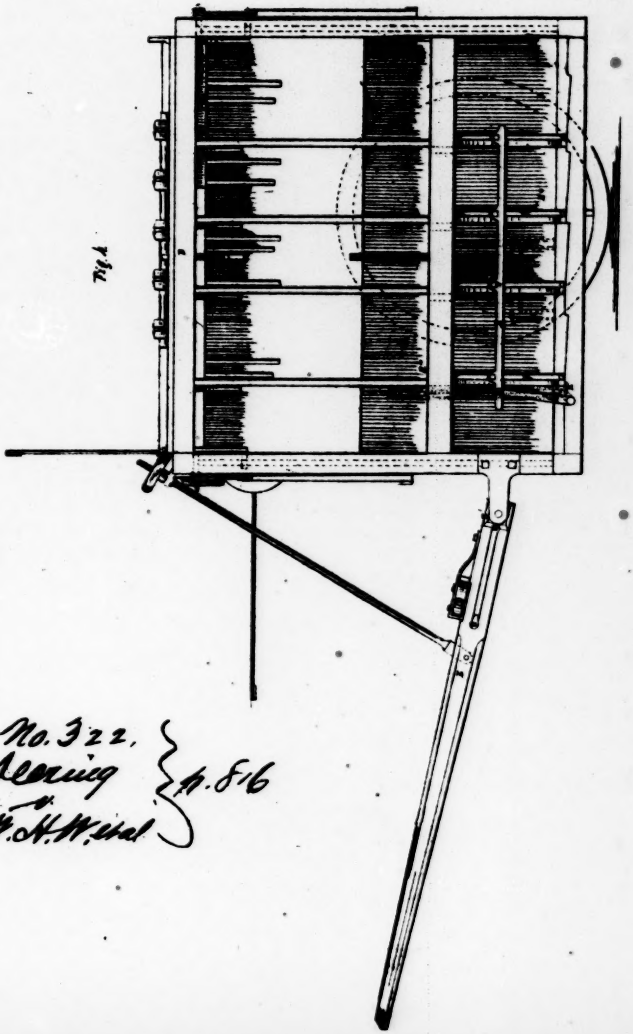


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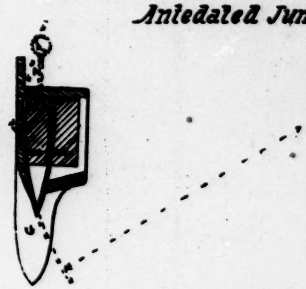

Fig. 1

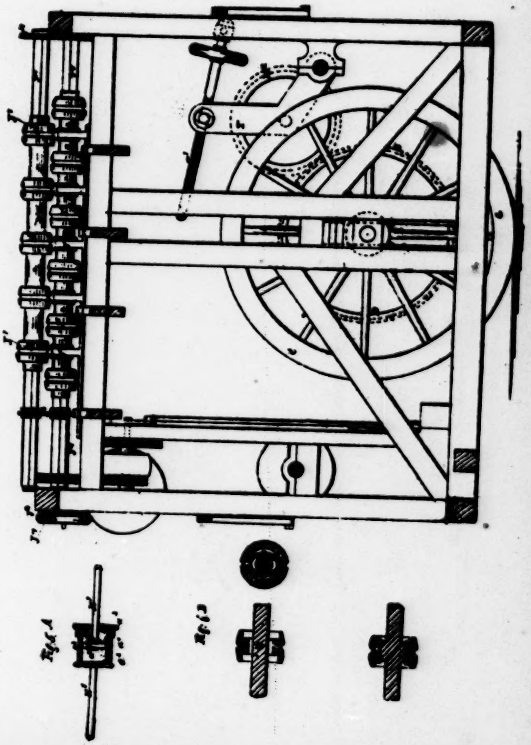

Fig. 5

Fig. 5 A

Fig. 6 B

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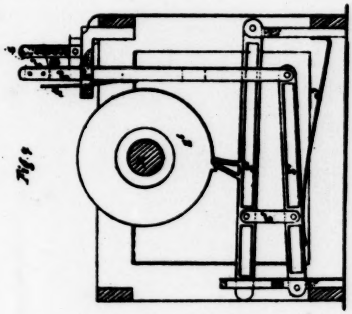

Fig. 9

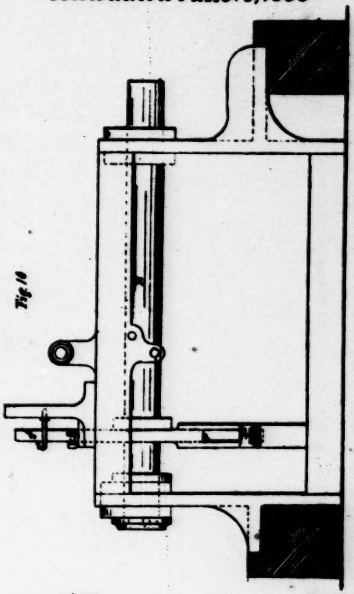

Fig. 10

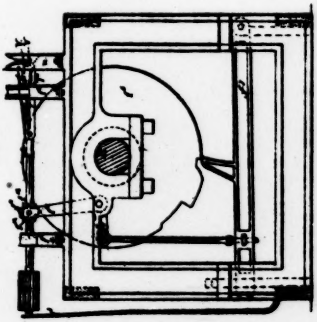

Fig. 8

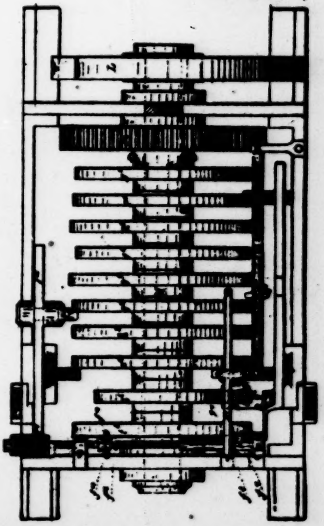

Fig. 7

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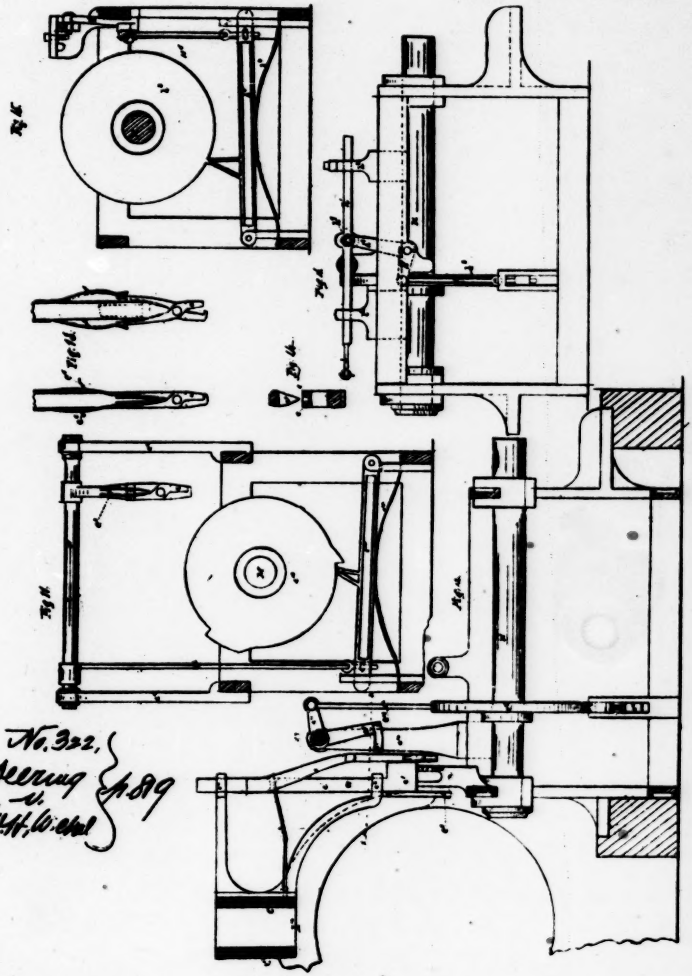

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(14 Sheets) Sheet 2.

# Watson & Renwick

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p. 820

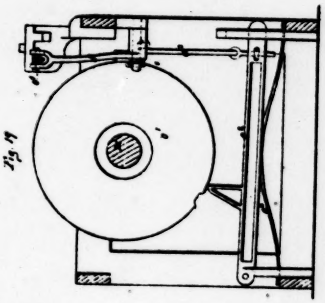

Fig 9

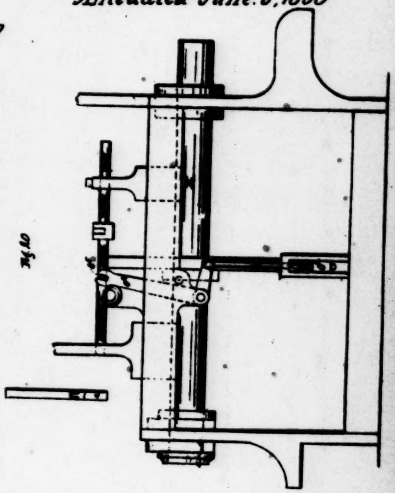

Fig 10

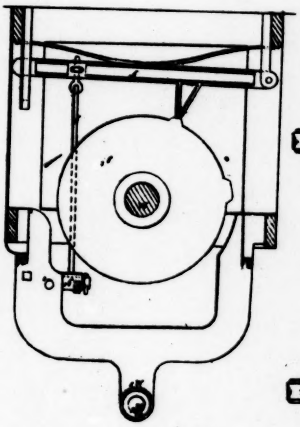

Fig 12

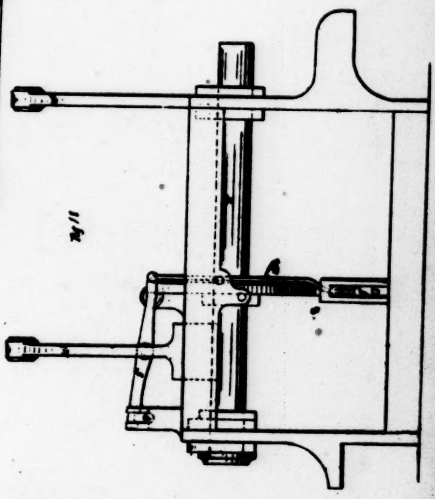

Fig 11

# Watson & Renwick.

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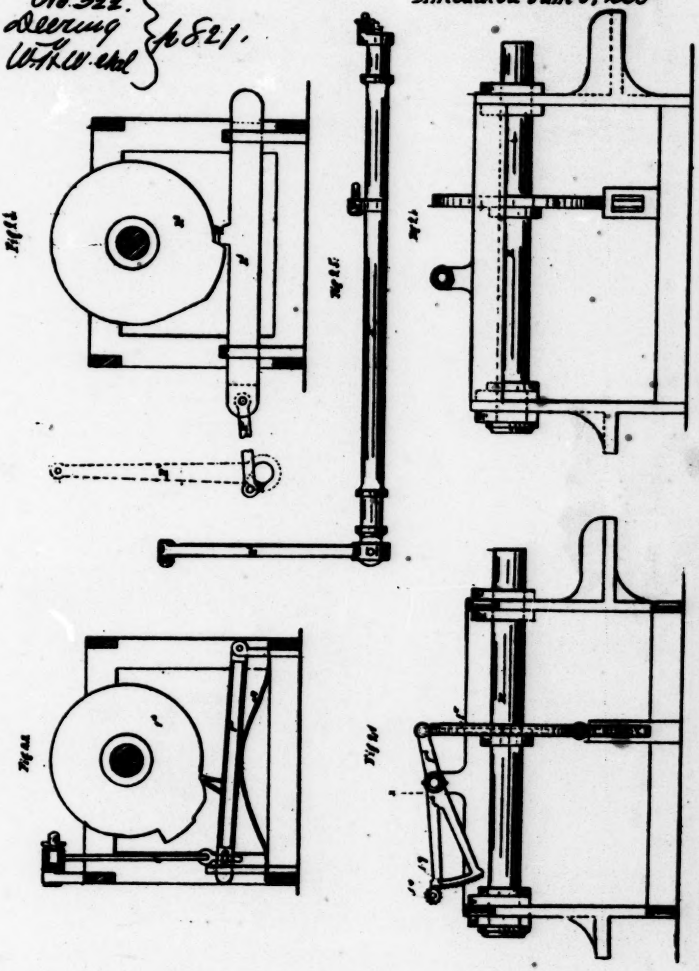

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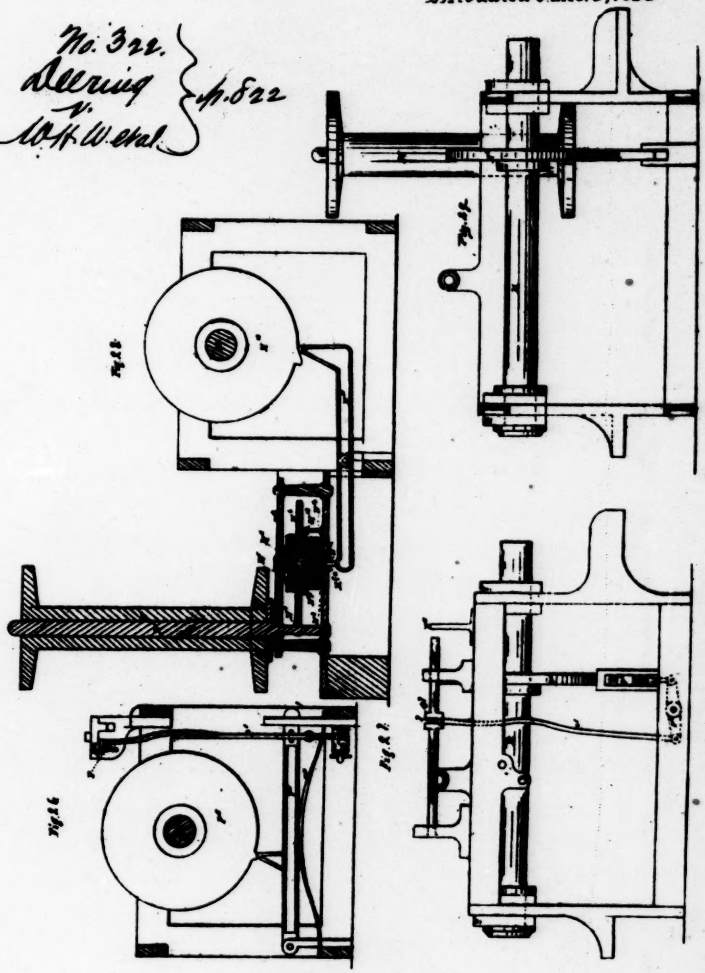

14 Sheets Sheet 11

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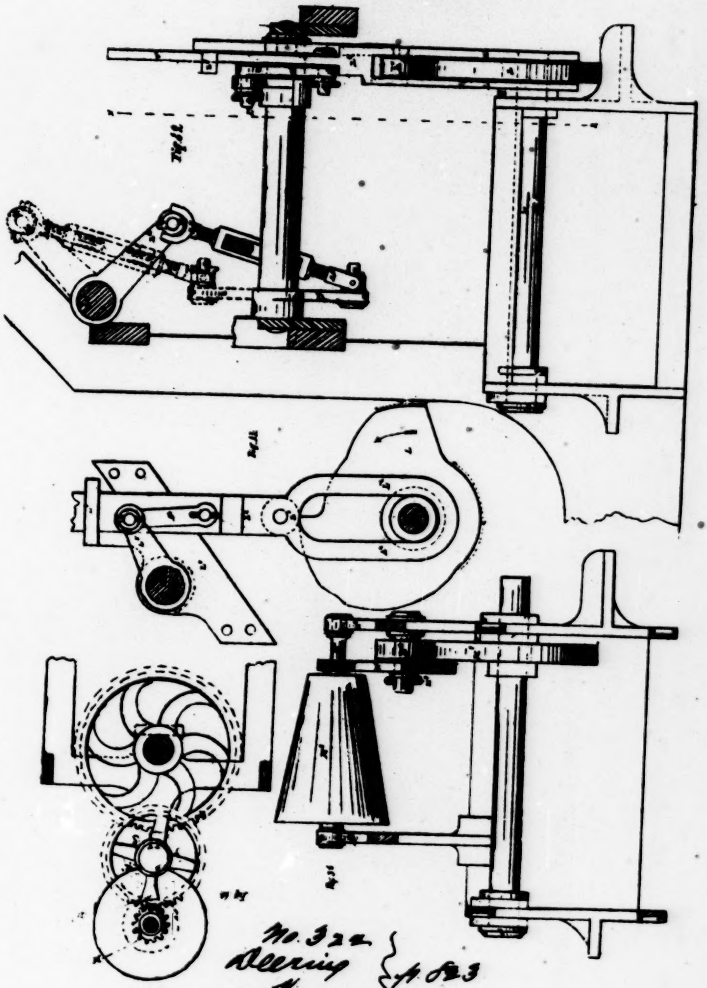

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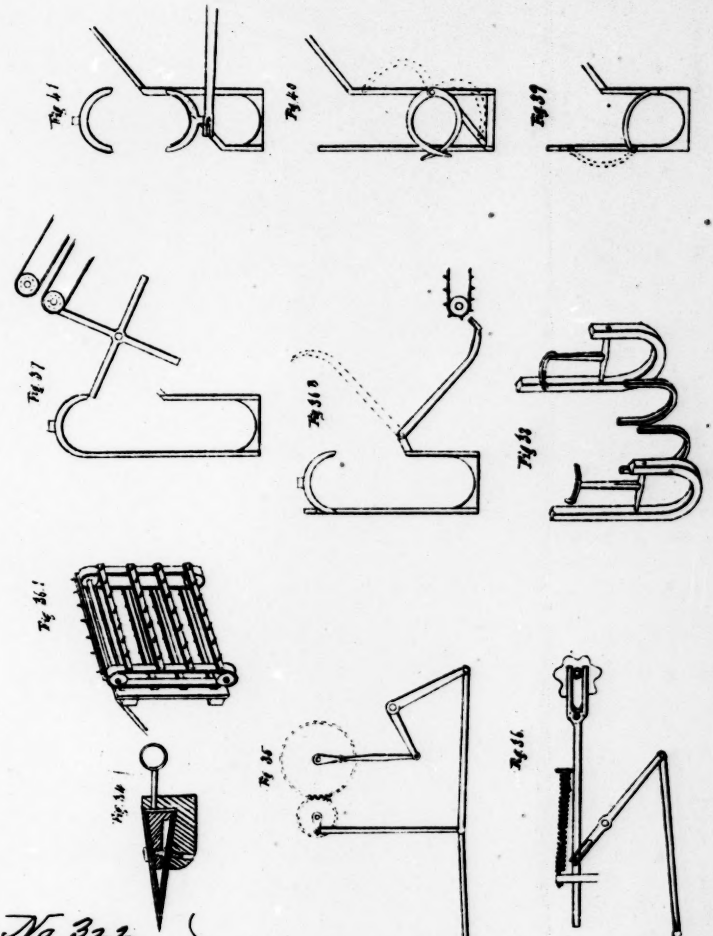


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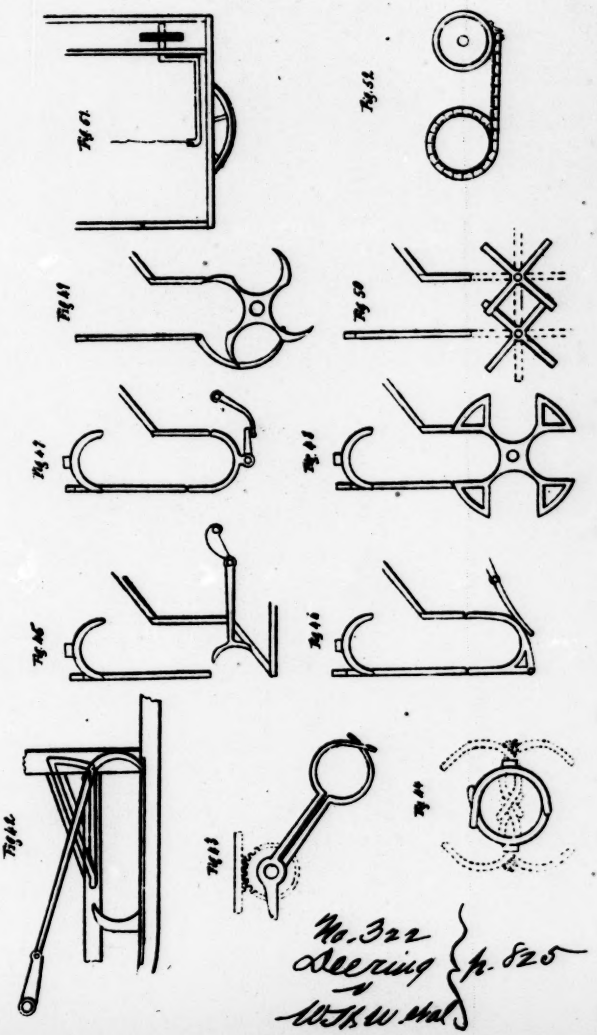


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Deering
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# Watson & Renwick.

## Harvester & Binder

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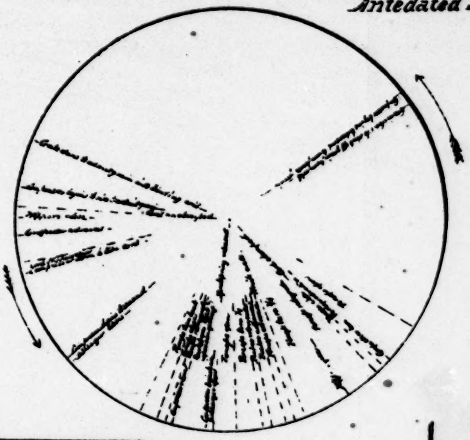
Antedated June 6, 1853



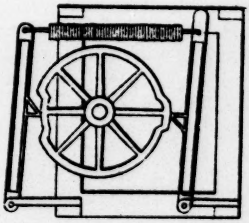


Fig. 55

Fig. 56

Fig. 57

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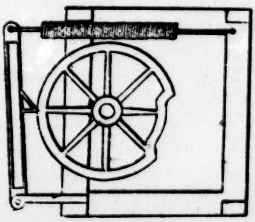

Fig. 53.

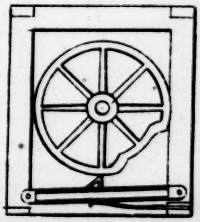

Fig. 54.

is a side view of the same at right angles to that shown in Fig. 15. Fig. 17 is a cross-section of a portion of the binding mechanism, showing the lever for closing the tying-forceps and the mechanism by which the same is operated. Fig. 18 is a side view of the same at right angles to that shown in Fig. 17. Fig. 19 is a cross-section of a portion of the binding mechanism, showing the cord-feeder and the mechanism by which it is operated. Fig. 20 is a side view of the same at right angles to that shown in Fig. 17, showing also the cord-nippers in their proper relative position. Fig. 21 is a longitudinal section of a portion of the binding mechanism, showing the device for turning the tying-forceps. Fig. 22 is a cross-section of the same at the line *x x* of Fig. 21. Fig. 23 is a cross-section of a portion of the binding mechanism, showing a portion of the mechanism for actuating the discharging-gate. Fig. 24 is a side elevation of the same, showing a view of the parts at right angles to that represented in Fig. 23. Fig. 25 is an elevation of the rock-shaft and its arms, which form parts of the mechanism for transmitting motion from the cam to the discharging-gate. Fig. 26 is a cross-section of a portion of the binding mechanism, showing the clamp of the cord-feeder and the mechanism by which it is actuated. Fig. 27 is a side elevation of the same, showing a view of the parts at right angles to that represented in Fig. 26. Fig. 28 is a cross-section of a portion of the binding mechanism, of the spool for the binding-cord, and of the mechanism by which it is actuated. Fig. 29 is a vertical longitudinal section of the same, showing a view of the parts at right angles to that represented in Fig. 28. Fig. 30 is a cross-section of a portion of the binding mechanism, showing the gearing of the cam-shaft. Fig. 31 is a longitudinal section of the same, showing a view at right angles to that represented in Fig. 30. Fig. 32 is a side view of a portion of the frame of the binding mechanism and of a part of the device for actuating the compressor. Fig. 33 is a cross-section of the same at the line *x x* of Fig. 32.

The drawings from Figs. 8 to 33 included are on an en-
828 larged scale, say about one-half the linear dimensions of a working machine. Figs. 34 to 57 represent various modifications of the machine which will be more particularly described hereinafter.

In order that the nature of our invention may be the better understood, we will proceed to give a general description of our harvesting and binding machine, before describing its several parts in detail.

The machine consists principally of a broad platform, supported at a few inches above the ground by a pair of wheels. On the front edge of the platform a knife or sickle for cutting the grain is placed, and on one end of it is mounted an apparatus for binding the grain into sheaves, while the rest of its upper surface is traversed by rakes for gathering the cut grain preparatory to binding. Above and a little in advance of the front edge of the platform is a revolving reel, which has four vanes, that in succession press the grain against the sickle, and turn it onto the platform after being cut. The machine is drawn forward by horses, which are harnessed to a tongue

which projects from the front of that portion of the platform occupied by the binding apparatus. One of the carrying wheels actuates the gearing, which gives motion to the cutting, gathering, and binding mechanism. As the machine is drawn forward the vibrating cutter on the front edge of the platform is pressed against the stalks of the grain, and cuts them off, when they are turned back by the reel upon the rake. The latter conveys them to the binding apparatus, where, as soon as a sufficient quantity has accumulated to form a sheaf, it is compressed into a compact bundle by mechanical arms, and encircled with a band, after which the ends of the band are knotted together by mechanical fingers. This operation completes the binding of the sheaf, which is then dropped at the side of the machine, when the latter immediately proceeds to form another sheaf.

Our improvements may be conveniently arranged under several heads, which relate to different parts of the machine. Some of these improvements are applicable to the mowing of grass, as well as to the harvesting of grain, and many of them may be applied with advantage to mowing and harvesting machines already in use.

The first part of our invention consists of a sickle furrowed transversely on one side from edge to edge, so that by beveling off the front edge of the opposite or smooth side by grinding, or otherwise, a serrated cutting-edge is produced, which, when worn smooth, can be continually reproduced by grinding until the blade is worn out.

The second part of our invention consists in making the knife or sickle of two parallel blades in such manner that their edges shall meet and form a single doubly-serrated cutting-edge, so that if one part of the double blade is moved faster than the other, or in a different direction, or if one is stationary and the other is moved, a divided edge will be produced, which in its operation will combine the action of both the knife and shears.

The third part of our invention relates to the movement of the knife, and consists in imparting to it a compound reciprocating motion, so that its motion in either direction is effected by a series of short jumps, by which motion its cutting action is improved and its liability to clog diminished.

The fourth part of our invention has for its object the lessening of the vibrations which are always produced in thin sickle-blades by a rapid reciprocating movement, and which tend to increase the friction of the sickle and to cause its teeth to strip off when brought in contact with any hard substance that may by accident be found among the standing grain. This branch of our invention consists in connecting the sickle-blade with the mechanism by which it is operated by means of an elastic connecting-rod, which expands and contracts under the strain produced by sudden changes in the direction of the movement of the knife.

The fifth part of our invention consists of a shield-plate, which overlies the blade and extends nearly to its cutting-edge, to prevent the stalks of the severed grain from resting upon the blade after being cut and while falling over upon the platform.

The sixth part of our invention has for its object the protection

of the blade from injury by the pulling action of the stubble, and also to steady the stalks while being cut off; and this part of our invention consists in placing a bar, smooth or serrated, which we call the stubble-guard, beneath the front edge of the knife.

The seventh part of our invention consists in arranging the knife in such manner that its cutting edge can be kept at the proper distance in advance of the stubble-guard or the shield, whether it be new and broad or worn and narrow.

The eighth part of our invention consists in a method of moistening the knife while the machine is in motion, to prevent its clogging or gumming, and thus facilitate the cutting of the grain.

The ninth part of our invention has reference to the raking of the cut grain and to its delivery to the binding apparatus; and it consists in raking the grain continuously by the operation of endless bands or otherwise while the binding is performed at intervals, the two operations being thus independent of each other, whereby the mechanism of a compound reaper and binder is simplified, while at the same time the rate at which the binder works can be varied according to the state of the crop without affecting the operation of the binding apparatus.

The tenth part of our invention consists in the method of obtaining the requisite space for compressing the grain into a
829 sheaf, and binding the same, without increasing the horizontal area of the machine, by conveying the grain upward from the raker to an elevated platform, where it is transferred to the binder.

The eleventh part of our invention has reference to the binding of grain of different lengths into sheaves, without changing the relative positions of the cutting and binding apparatus; and it consists in conveying the cut grain from the cutting to the binding apparatus by means of a series of shifting endless bands or their equivalents, arranged in such manner that without stopping the machine they can be adjusted to present the grain to the binder in such a position that the band will be passed round the middle of the sheaf, whether the latter be long or short, whereby the machine is rendered more rigid, as the cutting and binding mechanism can both be permanently secured to the frame.

The twelfth part of our invention consists of a device for conveying the grain from the rake to the binder, which is composed of two parallel series of endless bands, the bands of one series being arranged with teeth which receive the grain between them, where it is securely held by the bands of the other series while being conveyed, without being subjected to such a degree of pressure as to endanger its thrashing.

The object of the thirteenth part of our invention is to provide a method of compensating for the alternate stretch and contraction of the conveyers, which results from alternate moistening and drying, by working grain wet with dew in the morning, and dry grain in the middle of the day; and it consists in pressing apart the belt-rollers by springs, which will yield to the contraction of the belts, and expand again to tighten the belts when they stretch.

The fourteenth part of our invention relates to the discharge of the grain from the conveyer; and it consists of a stripper or comb, which works in connection with the endless bands so as to insure the delivery of the grain therefrom.

The fifteenth part of our invention relates to the reception of the grain from the conveyer while a sufficient quantity to form a sheaf is accumulating, and to the discharge of the accumulated grain into the binder to be bound when a proper quantity has been gathered to form a sheaf of the required size; and it consists of a gate working in connection with the platform, and opened and closed at proper intervals to discharge the gathered grain into the binder, and to stop the discharge until another like quantity has accumulated to form another sheaf.

The sixteenth part of our invention has reference to the apparatus by which the cord is caused to encircle the sheaf, and is brought into the proper position to be tied. This part of our invention consists in causing the nippers to traverse with the apparatus for squeezing or compressing the sheaf, while the cord-feeder has merely enough movement imparted to it to enable it to deliver the extremity of the cord to the traveling nippers, and to move out of the way of the tying mechanism.

The seventeenth part of our invention relates to the delivery of the cord from the spool to the tying mechanism; and it consists of a clamp whose action is regulated by a cam acting in combination with the cord-feeder for the purpose of preventing the movement of the cord therein during certain parts of the operation of forming the sheaf.

The eighteenth part of our invention relates to the adjustment of the tension of the binding-cord according to the degree of its rigidity, or the tightness with which it is desirable or necessary to draw it round the sheaf; and this part of our invention consists in the combination of an adjustable stop with the barrel of the tension-spring, which admits of the latter being set to act with more or less force, as may be required.

The nineteenth part of our invention relates to the operation of tying the knot; and it consists in giving to the tying-forceps a longitudinal traversing movement, first backward to allow the two ends of the band to be laid together preparatory to tying, and then forward to seize the two ends thus laid together to tie them.

The twentieth part of our invention also relates to tying the knot; and it consists of a pronged or forked standard placed within the range of the tying-forceps, and acting in connection with them, the pushing-rod, the cord-feeder, and the traveling cord-nippers, to assist in steadying and tying the cord.

The twenty-first part of our invention relates also to the tying of the knot, and to the compression of the sheaf; and it consists in giving to the compressor a double movement, or a descent in two steps, the first step to reduce the sheaf very nearly to the required dimensions and to encircle it with the cord, and the second step of the descent to complete the compression of the sheaf or to reduce its size sufficiently to leave the cord slack enough to be twisted and

drawn into a loop by the tying-forceps in the process of making the knot.

The twenty-second part of our invention also relates to the operation of tying the knot; and it consists in mounting the cord-nippers upon a sliding spring-stock, or the equivalent thereof, in such manner that the nippers will descend with the loose end of the cord to encircle the sheaf before the compressor reaches its lowermost limit, the spring afterward yielding to allow the compressor to complete its descent.

The twenty-third part of our invention also relates to the operation of tying the knot; and it consists of a brake applied to the cord at some point between the place at which the knot is tied and the extremities of the band, to insure the stretching of the ends of the cord across the loop preparatory to their projection through it.

830 The twenty-fourth part of our invention consists of an apparatus for discharging the sheaf by depressing sections of the ribs which form the crib in which the sheaf is compressed and bound, which depressed sections are raised after the sheaf has been delivered from the machine.

The last part of our invention has reference to the relative positions of the cutting and binding apparatus; and it consists in arranging the two upon the opposite sides of the driving-wheel in such manner that the weight of the cutting apparatus is counterbalanced to a great extent by that of the binder, and the proportion of the weight on the driver is increased, whereby it is caused to adhere to the ground with greater force, which insures its turning, whereby also the motion of the mechanism is rendered more regular, and the center of draft of the machine is maintained more nearly in the middle of the path in which the horses walk, while at the same time increased space is obtained for the binding apparatus, which in this arrangement occupies the unappropriated space generally found in reaping-machines behind the horses.

In the accompanying drawings, A is the framed platform or carriage of the machine, which is supported above the ground upon two wheels, C C′. Each of these wheels is fitted with a separate axle, whose journals revolve in separate boxes, which slide vertically in suitable standards, forming part of the carriage-frame, so that the latter may be set to run at a greater or less distance above the surface of the ground, as may be required.

The mechanism for binding the grain, and for imparting motion to the several acting members of the machine, is supported in a frame, B, at one extremity of the carriage, and is driven from one of the running-wheels, C, whose axle is fitted with a cog-wheel, D, from which the motion is taken.

The front of the binding-frame has a tongue, E, projecting from it, to which the horses are attached in the usual manner. The cross-bar E′ of this tongue is hinged to the frame, and the tongue itself is connected, by an adjustable brace, $E^2$, with the upper front rail of the binding-frame B. The lower extremity of this brace is pivoted to the tongue. Its upper extremity has a screw cut upon it,

which passes into a nut, $E^4$, supported by a bracket upon the front rail of the frame, and this nut is fitted with a hand-wheel, $E^4$, so that it may be turned to screw the rod up or down, and thus cause the machine to turn upon the axles of the running-wheels, as fulcra to raise or depress the front rail of the carriage and the cutter thereto attached.

That portion of the carriage between the running-wheels is fitted at its front with the cutting apparatus. This consists of a series of stationary fingers, G, which are secured to the front rail, G′, and of a reciprocating sickle or knife, H, which is caused to move to and fro in transverse slots formed in the bases of the fingers. The knife is of peculiar construction. It is composed of two blades, the lower of which, in this instance, is stationary, while the upper is moved to and fro over the lower. Each blade is formed of a curved plate of steel, whose convex surface is furrowed, and whose concave surface is beveled at its front edge to form an acute angle with the convex furrowed surface, thus forming a serrated cutting-edge. Curved knives of this construction may be conveniently formed by cutting a screw upon the surface of a steel tube, (the curvature of which corresponds with that of the knives to be formed,) and then by slitting the tube longitudinally into staves of the proper breadth to form a blade. Each knife-blade is secured to a stock, and that of the upper or movable knife is connected at the extremity nearer the driving wheel with the lower arm of an elbow-lever, $H^2$, by means of a connecting-rod, H′. This elbow-lever is pivoted at the intersection of its arms to an arm, $H^{3\prime}$, which depends from a short rock-shaft, $H^3$, supported in suitable boxes upon the frame of the machine. This rock-shaft is fitted with a second arm, $H^4$, whose extremity is connected, by a rod, $H^5$, with a crank, $H^6$, secured to a shaft, $H^7$, that has a continuous rotary movement imparted to it, so that the rock-shaft $H^3$ with its arms is caused to vibrate or rock. The horizontal arm of the elbow-lever $H^2$ is also connected, by a rod, $H^8$, with a crank, $H^9$, which is secured to a crank-shaft, $H^{10}$, parallel with that first mentioned. The second crank-shaft, $H^{10}$, is caused to revolve from the first, $H^7$, but at a greater speed, by means of a cog-wheel and pinion, $H^{11}$ and $H^{12}$, so that the elbow-lever $H^2$ driven by it is caused to vibrate much more rapidly than the arm $H^3$, to which it is pivoted. It results from this arrangement that the movable sickle-blade is caused to move to and fro in a succession of short jumping strokes, which overlap each other, by which means a fast cutting motion of short range is imparted to the blade, while at the same time the portions of the blade moving in this manner are brought in continually new positions with respect to the lower stationary blade and sickle-fingers, whereby an equality of wear is insured and the self-clearing of the knives is promoted.

A rapid vibratory movement is always attended with the jar produced in overcoming the momentum of the mass moved each time the direction of the movement is reversed. In order to diminish this jar and the injurious effects resulting from it to the machinery, the connecting-rod H′, by which the sickle-blade is connected with the elbow-lever, is made elastic. This is effected by forming it of

two sections, one of which, as shown in Fig. 5 A terminates in a disk, $a^4$, which is received between two springs of vulcanized india-rubber, $a^2$, contained in a tubular spring-box, $a^3$, secured to the adjacent extremity of the other section. The head of this spring-box is perforated to permit the free movement of the section of
831 the rod to which the disk $a^4$ is secured, so that the latter is maintained in a central position in the spring-box solely by the elasticity of the springs. From this method of construction it is obvious that the momentum of the moving blade at each change in the direction of its motion is deadened by the springs, which lessen the jar and render it practically inappreciable.

The beveled edges of the two knife-blades bear upon each other, as shown in the drawings at Fig. 6^, which represents a section of a cutting apparatus; hence the wearing away of the beveled edges by mutual attrition will cause them to sharpen each other, and as the beveled faces of the blades are ground away the serration of the edges is continually renewed by bringing into use new portions of the exterior furrowed surfaces. The cutting action of the instrument thus formed is that of the shears and knife combined. It resembles the former instrument in the shearing action produced by the movement of the serrated edge of one blade over that of the other, and it resembles a knife in the acute edge it presents to the standing grain. As the front edges of the blades are worn away by use, the blades are set forward upon their stocks, and provision is made for this operation by passing the bolts which connect the blades with their stocks through transverse slots in the former.

In order to prevent the gumming of the knife, and at the same time to facilitate its cutting action, it is kept continually moistened with water, so that the grain, even at midday, is cut with the same facility as when it is covered with the dew of the morning. This moistening is effected in the present machine by means of a reservoir, F, and a distributing pipe, F′, that extends the whole length of the cutting apparatus. The reservoir is situated on that part of the carriage behind the horses where it can be conveniently replenished. The distributing-pipe F′ extends laterally from the reservoir, and is fitted with a series of small branch pipes, $F^2$, which deliver the water between the two knife-stocks of the compound blade, whence it works forward and escapes between their cutting-edges. The distributing-pipe is fitted at the reservoir F with a valve or stop-cock, $F^3$, to regulate the supply of water, and a flange on the back of the lower knife-stock is extended upward behind the upper one to prevent the escape of water in a backward direction. The water supplied not only facilitates the cutting action of the knife, but also acts as a lubricator to reduce its friction in moving to and fro.

The fingers G, which support the knife and prevent the escape of the grain in a lateral direction while the knife is acting upon it, are conveniently formed of cast metal, and are attached by their bases to the front rail or cutter-bar, G′, of the machine. These fingers, as shown at Fig. 6^, have two shields, the one, $G^2$, of which extends over the knife or sickle nearly to the cutting-edge thereof, and thus protects its upper surface from the butts of the falling grain, which

would otherwise, by bearing on the sickle, not only engender a considerable amount of friction, but would themselves be moved laterally by the quick movement of the sickle, and thus fall in confusion upon the platform behind. The other shield, $G^3$, projects downward in nearly a vertical direction from the cutting-edge of the sickle, and protects its lower surface from the stubble left in cutting the grain, and which would otherwise bear against the lower surface of the sickle, and tend to drag it downward as the machine is moved forward over the stubble. The lower guard may be grooved or serrated on its front side to help to hold the straw firmly under the action of the sickle.

The standing grain is pressed upon the edge of the sickle by a revolving reel composed of a series of bars, I, which are secured to arms I′, projecting from a shaft, $I^2$. This shaft is caused to revolve as indicated by the arrows in Fig. 2.

The platform upon which the cut grain is received is traversed by a raking apparatus, whose office is to gather the grain toward the binding apparatus. This raker consists of a series of endless bands, J, which are supported upon rollers $J'$ $J^2$, situated at the opposite extremities of the platform. The upper portions of these bands, upon which the cut grain falls, are moved by the turning of the roller $J^2$ nearer the binding apparatus, toward the side of the machine on which the latter is mounted, while the lower portions of the bands return in the opposite direction to the opposite extremity of the platform. The bands thus collect the grain as it falls and rake or gather it toward the binding apparatus, and this process proceeds continually, for the bands are caused, by the continuous rotation of the roller $J^2$, to move in a regular and continuous manner.

The raking-platform is situated at one side of the driving-wheel, and the binding apparatus is situated at the opposite side thereof. The two thus counterbalance each other's weight to a considerable extent, and as the driving-wheel is situated between them, it is pressed upon the ground by a large preponderance of the whole weight of the machine. This arrangement is attended with two important advantages: In the first place, the mean line of draft is brought in line, or nearly so, with the tongue, and hence the carriage does not tend to move obliquely; in the second place, a great weight is thrown upon the driving-wheel, which is thus prevented from slipping, thereby insuring its rolling upon the ground.

In order to convey the raked grain from the platform to the binder and to elevate it sufficiently to permit of the vertical compression of the grain in forming a sheaf, a conveyer is provided, which not only effects these purposes, but also regulates the position on the sheaf of the cord or band by which it is bound.

832 This conveyer consists of two series of endless bands, which act in connection. Those, $J^3$, of one series are passed round a roller, $J^4$, parallel with and adjacent to the roller $J^2$ of the raking-bands, while their upper extremities are supported and put in motion by a second roller, $J^5$, situated near the top of the binder-frame. The bands $J^6$ of the other series are passed around an upper roller,

$J^7$, and a lower roller, $J^8$, corresponding in their relative positions with those of the first series. As each series is composed of narrow bands, those of one series are arranged opposite the spaces between those of the other, and the bands of the lower series are arranged to work in the spaces between those which effect the raking, so that no space is left for grain to drop in passing from the raking-bands to those of the conveyer.

In order that the grain may not slide on the lower bands of the conveyer, they are studded with teeth, $J^{13}$, between which the grain is received, and it is prevented from escaping from between the teeth by the upper bands, which ride upon it and hold it in place. In order that the grain may not be rubbed, and thus partially thrashed, by the moving of one apron at faster speed than the other, the two are passed over rollers of the same diameter whose axles are connected with equal cog-wheels $J^9$ $J^{10}$, which gear into each other.

As the grain arrives at the upper extremities of the conveyer, it is stripped therefrom and delivered upon an elevated platform, whence it descends to the binding apparatus. This stripping is effected by a series of fingers, $J^{11}$, whose outer extremities bear upon portions of the roller of the lower bands, which are of less diameter than those portions thereof on which the bands are supported. The opposite or inner extremities of these stripping-fingers are attached to a bar, $J^{12}$, which is supported in notches formed in the adjacent extremities of the inclined ribs B′, which constitute the elevated platform above mentioned.

In the machine we are describing the binding apparatus is fixed to the carriage, and the sickle or cutting apparatus is also fixed thereto; hence, if no provision were made for the purpose, the stalks of grain, whether long or short, would always be bound at the same distance from their butts. Grain, even in the same field, varies considerably in the length of its stalks, and it is desirable that the sheaves should be bound near about the middle of their length. In order to effect this result in a machine like the present, in which the sickle and binder are not made adjustable with respect to each other, the conveyer is constructed in such manner that it delivers the grain upon the elevated platform B′ with the middles of the stalks in a proper position for receiving the binding-band, and that, too, whether the grain cut be long or short, within certain limits. This is effected by shifting laterally the upper extremities of the conveyer-bands, while the lower extremities maintain always the same relative positions with respect to the raker. This lateral shifting of the bands in the machine we are describing is effected by making the upper rollers, $J^5$ $J^7$, tubular and mounting them upon shafts $J^{14}$ $J^{15}$, upon which they can slide endwise. In order to move them simultaneously upon their shafts, each roller is grooved to receive the forked extremity of a shifting-fork, $J^{16}$, which can be moved to shift the rollers by means of a screw-rod, $J^{17}$, and nut $J^{18}$. The latter is fitted with a hand-wheel, $J^{19}$, which is within reach of the driver, so that he can turn the nut to shift the positions of the aprons, and thus regulate the position of the binding-band upon the sheaf.

As the conveyer-bands are shifted in one direction or the other, it is essential to the perfect action of the machine that the stripping-fingers should shift with them. This shifting of the fingers is effected by connecting the stock or rod $J^{12}$, from which they project, with the shifting-fork $J^{16}$, so that the fingers are forced to move simultaneously with the bands. As the bands which form the conveyer, when forced to run obliquely, would naturally tend to work endwise upon their rollers, each one has a cord attached to its inner side, which is received in corresponding grooves formed in the peripheries of the upper and lower rollers. And in case it should be found necessary to cause the bands to run so obliquely that this method of guiding them should prove insufficient for the purpose, we propose to form each roller of a series of pulleys, each of which, as shown in Fig. $6^{B}$, is secured to the roller-shaft by a species of universal joint, which permits the pulleys to accommodate themselves to the obliquity of the bands which run upon them.

The lengths of the raking and conveyer bands, if made of canvas, will vary under different circumstances. Thus, for example, in the morning, when the grain is moist with dew, the bands, being dampened, will contract in length, while as the dew dries up they will elongate again. In order to provide for this change in the lengths of the bands, and at the same time to keep them constantly under a sufficient strain to insure their efficient action, one of the rollers of each series of bands is made self-adjusting. This self-adjusting is effected in the machine we are describing by mounting the journals of the roller upon springs, which constantly tend to move it from the opposite roller of the series, thus straining the bands which run upon the two and permitting the roller to move sufficiently to accommodate itself to their varying lengths. This arrangement is shown at Fig. 2, $J^{20}$ being the springs, which bear upon the journals of one of the conveyer-rollers $J^{7}$. The journals of the roller on which the springs act are supported in slotted boxes, which allow them to move sufficiently, and at the same time guide them in moving. In the present machine the upper roller, $J^{7}$, of the upper series
833 of conveyer-bands, the lower one, $J^{4}$, of the lower series, and the outermost roller, $J'$, of the raking-bands, are those to which this spring-adjusting apparatus is applied.

As we have stated before, the grain is delivered by the conveyer upon an elevated platform, formed of rails $B'$, whence it descends to the binding apparatus. This elevated platform extends over the driving-wheel C and slopes downward toward that side of the machine further from the rake. Its slope or inclination is sufficient to permit the grain to slide down freely by its gravity into a vertical crib, K, in which the grain is compressed into bundles or sheaves and encircled with the binding-cord.

In the machine we are describing the rake and conveyer work continuously, while the binding apparatus must of necessity receive the grain at intervals in order to convert it into sheaves. The conveyer is, therefore, continually delivering the grain upon the elevated platform, down which it slides toward the binding-crib. The descent of the grain is, however, stopped by a gate $K'$, which re-

mains closed until the binding apparatus has formed a sheaf and discharged it, and is then raised to permit the descent into the crib of the grain which has meanwhile accumulated upon the elevated platform. This gate is composed of a series of teeth projecting from a horizontal stock, which is connected by radius-bars $K^2$, with pivots $K^3$, secured to the frame of the machine at points near the upper rollers of the conveyers. This gate remains down by its gravity until raised to permit the descent of the grain into the crib. When raised it moves up behind a fixed screen, $K^4$, which protects the gate-stock from the grain upon the platform. The raising of this gate is effected in the present instance by the rising of the compressor, in a manner we shall presently describe.

The compressing-crib, which receives the grain delivered by the raising of the gate, is formed of two parallel sets of ribs, *b b'*, which inclose a space between them equal in breadth with the diameter of the sheaves to be formed. The ribs *b'*, at the inner side of the crib, pass down to the bottom of the frame of the carriage, where they extend across the crib in circular curves to form its bottom. The ribs at the outer side of the crib are divided into two sets, one of which, *b*, extends from the top of the frame to a cross-rail, $b^3$, and the other set, $b^4$, extends from the cross-rail to the bottom of the crib, which they partly cross in circular curves. These lower ribs are hinged at their lower extremities to the corresponding portions of the inner ribs, and are constructed to turn laterally upon their hinges, and thus form a gate for the discharge of the bound sheaf. The crib thus formed is traversed by the compressor $L^{12}$, whose office is to compact into a sheaf the loose grain dropped into the crib by the raising of the platform-gate, and to hold the sheaf thus formed until the binding is completed. This compressor consists in this instance of a compound beam, *c*, extending the whole length of the crib, and fitted with a series of inverted crutches or yoke-ribs, *c'*, which project from its lower edge and correspond in position with the stationary curved ribs of the crib. This compressor is constructed to traverse up and down in the crib upon guide-rods $L^{18}$, which are secured to the frame of the carriage. It is moved at the requisite intervals and held in the proper positions by the action of a cam, L, which is secured to the cam-shaft M of the binding mechanism. This cam, as shown in detail at Figs. 32 and 33, acts upon a friction-wheel, L', secured to the lower extremity of an upright bar, $L^2$, whose upper extremity is guided by a guide-box, $L^3$, while its lower extremity is also guided by being forked to traverse upon the cam-shaft M. The sliding bar $L^2$ is connected, by a link-rod, $L^4$, with an arm, $L^5$, projecting from a transverse rock-shaft, $L^6$, whose journals are supported in suitable boxes formed in plates $L^7$ secured to the frame of the machine. This transverse rock-shaft is fitted with a second arm, $L^8$, which is connected, by an adjustable connecting-rod, $L^9$, with an arm, $L^{10}$, projecting from a longitudinal rock-shaft, $L^{11}$, that extends parallel with the compressor $L^{12}$. The extremities of this longitudinal rock-shaft $L^{11}$ are fitted with arms $L^{13}$, whose ends have wrist-pins $L^{14}$ secured to them, which are received in slots formed in lifting-levers

$L^{15}$. These latter are pivoted at one of their extremities to the frame of the machine, while their other extremities are connected with the opposite traverse-blocks $L^{16}$ of the compressor-beam by means of suitable link-rods $L^{17}$. The operation of this mechanism is such that, as the cam is turned by the revolution of the cam-shaft, the compressor is alternately depressed, held stationary, and permitted to rise, which last operation is effected by the action of suitable springs, which, being connected with the arms $L^{13}$ of the longitudinal rock-shaft $L^{11}$, are extended when the compressor is depressed, and act by their tensive force to re-raise them, together with the compressor upon which they act, whenever the shape of the cam L permits them to rise.

The mechanism for effecting the binding of the sheaf is mounted upon a separate frame, which is removable from the frame of the machine, and which, being of small bulk, may be formed wholly of metal. The principal operations effected by this mechanism are, first, operating the compressor, by which the sheaf is formed as above stated; second, encircling the grain with cord from a reel or bobbin; third, severing the band or portion around the sheaf from that upon the bobbin and tying it into a knot; fourth, operating the discharger by which the bound sheaf is delivered from the machine. These principal operations are subdivided into secondary ones, which are all effected by the rotation of the cam-shaft
834 of the binding mechanism acting, through the intervention of suitable cams, treadles, connecting-rods, and levers, upon the instruments which perform the work. This binding mechanism is represented in detail on a scale of six inches to the foot at Figs. 7 to 31, inclusive, to which this portion of our specification particularly refers. In these various figures the mechanical devices for effecting each movement are shown from their source of motion or the cam-shaft to the point at which they act.

The cord by means of which the grain is bound is contained upon a spool, N, which fits tightly upon a spindle, N′, but can be removed when the cord upon it is used up to be replaced by a full spool. The spool spindle is fitted with a collar on which the spool-head rests, and with pins *d d*, which engage in corresponding holes formed therein, and thus cause the spool and its spindle to turn simultaneously. This spool-spindle is supported by a frame, $N^2$, connected with the frame of the binding mechanism. It is fitted with a pinion, $N^3$, whose teeth engage with those of a wheel, $N^4$, mounted upon a tubular shaft, $N^5$, parallel with the bobbin-spindle. The body of this wheel is traversed by the arms of a spring-clutch, $N^6$, which, passing through slots in the wheel, bear upon the face of a disk, $N^7$, on the opposite side thereof. This disk is faced with leather or some other soft substance, and the arms of the clutch are roughened to indent themselves therein. This disk is secured to a sleeve, $N^8$, which is constructed to turn freely upon the tubular shaft, and has a spring coiled upon it which tends constantly to turn the sleeve, together with the tubular shaft and cog-wheel, with which it is connected by the spring clutch, in such a direction as will effect the winding up of the cord upon the spool. The clutch

is moved from the disk, to break the connection between the spring $N^9$ and the spool N, by means of a cam, $N^{10}$, upon the cam-shaft M, acting through a treadle, $N^{11}$, and a piston-rod, $N^{12}$, the last of which is contained within the tubular shaft $N^5$ and acts directly upon the clutch $N^6$. When the connection is thus broken, the spring, if previously contracted, tends to unwind and regain its most distended form, which operation is limited by the striking of a pin, $N^{13}$, screwed to the disk $N^7$ against a fixed arm, $N^{14}$, secured to the spool-frame.

The cord from the spool is conducted through an eyelet in a bracket, $N^{15}$, to the inner extremity of a tubular cord-feeder, O, supported in suitable bearings upon the frame of the binding mechanism. The office of this cord-feeder is to present the extremity of the cord to a pair of nippers, by whose action a sufficient length of cord to encircle the grain delivered into the crib is drawn off. This cord-feeder is moved toward and from the adjacent side of the compressor (when the same is depressed) by the revolution of a cam, O′, on the cam-shaft M acting through the intervention of a treadle, $O^2$, connecting-rod $O^3$, and elbow-lever $O^4$ upon pins $O^5$, which project laterally in opposite directions from the cord-feeder, and are received in slots formed in the longer forked arm of the elbow-lever. The cam acts to draw the corn-feeder inward, or from the compressor $L^{12}$, and to hold it in that withdrawn position until it is to be moved forward, which operation is effected by a spring, $O^6$, situated beneath the treadle $O^2$, and acting antagonistically to the cam O′, and causing the shoe of the treadle to enter a notch in the cam whenever the latter turns to the proper position to admit it, and thus permit the outward or forward movement of the cord-feeder.

The cord-feeder is tubular, and the cord passes through it. It is essential that the cord should be held firmly by the cord-feeder while the latter is moving forward to feed it to the nippers, while at other times the cord must be permitted to run freely through the cord-feeder. This gripping and releasing of the cord is effected by a spring gripping-jaw, P, which enters a slot formed in a protuberance, $O^7$, upon the cord-feeder, and is connected with a rod, P′, that extends downward to a lever, $P^2$, beneath. This lever is pivoted at its middle to one of the side rails of the frame, and its opposite extremity is connected with a treadle, $P^3$, that is pressed upward by a spring, $P^4$. This spring tends to depress the rod P′ and gripping-jaw P, and thus keeps the latter bearing upon the cord in the cord-feeder, while at the same time the length of the rod P′ is such that it does not oppose any appreciable obstacle to the movement of the cord-feeder by its appropriate cam and spring. The gripping-jaw is raised when required to permit the free passage of the cord by the depression of the treadle $P^3$, which is effected by a cam, $P^5$, secured to the cam-shaft M.

The pair of nippers $c$, by which the cord presented by the cord-feeder is seized, are mounted upon the lower extremity of the nipper-stock $c'$, which is constructed to slide vertically in guides formed in a bracket, $c^2$, that projects laterally from the compressor $L^{12}$.

This stock is pressed downward by a spring, $e^5$, and its downward movement under the action of this spring is limited by a pin, $e^6$. The pair of nippers is pivoted at the axis of its two jaws to that side of the stock which, when the compressor is depressed, faces the extremity of the cord-feeder. The opposite side of the nipper-stock, or that adjacent to the grain in the crib, is fitted with a fork, $e^7$, whose office will be hereinafter stated. From the connection of the nipper-stock with the compressor it is forced to travel with the latter, and is therefore depressed when the compresssor is descending to compact the grain in the crib, and raised again when the compressor is raised to permit the passage of a fresh quantity of grain from the elevated platform.

The jaws of the pair of nippers are pressed toward each other by a pair of springs, $e^8$, which act upon the shanks of the nip-
835 per-jaws, and tend constantly to hold them closed. The jaws are opened when necessary by the action of a wedge-block, $e^7$, which is secured to the extremity of an arm, $e^3$, that projects from a rock-shaft, $e^9$. The latter is supported by a pair of standards, $e^{10}$, erected upon the frame of the binding mechanism, and is fitted with a second arm, $e^{11}$, which is connected by a rod, $e^{12}$, with a treadle, $e^{14}$, beneath. This treadle is operated at the proper periods to drive the wedge-block by means of a cam, $e^{13}$, upon the cam-shaft M. It is returned to its position to draw back the wedge-block by means of a spring, $e^{15}$, which acts upon its lower face in opposition to the cam. When the wedge-block is moved by the cam, it enters point foremost between the shanks of the pair of nippers, and thus causes their jaws to diverge or open, and when it is drawn back by the action of the spring, after the projecting portions of the cam have passed the shoe $e^{16}$ of the treadle $e^{14}$, it retrogrades from the shanks of the pair of nippers, thus permitting them to be forced toward each other and closed by the action of the springs $e^8$.

The nipper-stock in descending strikes against a forked standard, $u$, which is secured to the front plate of the frame of the binding mechanism. This standard is doubly forked to permit the passage of the cord through it in a direction at right angles with the compressor-beam, and also the passage of the tying-forceps in a direction parallel with the compressor-beam, and therefore at right angles with the cord.

The tying-forceps consist mainly of two jaws, $f f'$, and of a shank, $f^2$, to which they are secured. One of the jaws, $f'$, is fixed to the shank. The other, $f$, is hinged thereto so that it can move toward and from the fixed jaw, and thus open or close. In this opening and closing it is guided by a steady-pin, $f^3$, which projects from the inner face of the fixed jaw, and enters a slot in the movable jaw. The latter is pressed constantly from the fixed jaw by the action of a spring, which is inserted between the adjacent faces of the two jaws, and tends constantly to keep them open, and reopen them whenever the force by which they have been closed is removed.

The tying-forceps are constructed to traverse to and fro in the direction of their length in slotted standards $f^4$. They are moved forward or toward the forked standard $u$ by means of a spring, $f^5$,

which bears against the extremity of their shank. It is caused to retrograde by the action of a cam, $f^6$, which acts upon a treadle, $f^7$, that is connected by a rod, $f^8$, with the shorter arm, $f^9$, of an elbow-lever, which is pivoted to the frame, and whose longer arm, $f^{10}$, is forked and fitted with a swivel-ring, $f^{11}$, through which the shank of the forceps passes. The opening in this swivel-ring is sufficient to permit the forceps to turn freely in whatever position it may be placed by the actions of the cam and spring, and the forceps are forced to move longitudinally with the swivel-ring and elbow-lever by means of two collars, $f^{12}$, which are secured to the shank of the forceps and embrace the opposite faces of the swivel-ring.

The formation of the knot on the binding-cord requires not only the longitudinal movement of the forceps, but also their revolution upon their axis and the opening and closing of their jaws. The turning of the forceps in one direction is effected by the operation of a cam, $f^{13}$, secured to the cam-shaft. This cam acts upon a treadle $f^{14}$, which is connected by a rod, $f^{15}$, with the hinder arm, $f^{16}$, of a lever, which is pivoted to a standard upon one of the side rails of the binding mechanism, and has its longer arm formed into a toothed sector, $f^{17}$, whose teeth engage with those of a pinion, $f^{18}$, secured to the shank of the forceps. This pinion has sufficient breadth of face to be constantly in gear with the toothed sector in whatever position the forceps may be placed in their longitudinal movement. The returning of the forceps when the projections of the cam have passed the shoe of the treadle is effected by a spring, $f^{19}$, which bears upon the lower face of the treadle, and tends to keep its shoe in contact with the periphery of the cam.

The opening of the forceps is effected, as before stated, by the spring between their jaws. Their closing is effected by a spring, $g$, acting upon a treadle, g′, beneath the cam-shaft, $g^2$. This treadle $g'$ is connected by a rod, $g^3$, with the hinder arm of a closing-lever, $g^4$. The latter is pivoted to the standard $g^5$, and its front arm is arranged to rise and fall in transverse slots formed in one of the standards in which the tying-forceps are supported. That extremity of the closing-lever which works in the standard is curved out to fit the exterior of the forceps. The treadle $g'$ is depressed, whenever the forceps are to be opened by the spring between their jaws, by means of a cam, $g^2$, upon the cam-shaft; and when the projecting portions of this cam pass the treadle-shoe $g'$ the spring raises the treadle, thus depressing the front arm of the closing-lever upon the forceps and forcing their jaws to close. In order that the treadle-spring may perform its work efficiently, it must be made considerably stronger than the forceps-spring, whose tension it has to overcome in depressing the closing-lever upon the forceps.

The office of the forceps is to close upon the extremities of that portion of the cord which has been extended around the grain in the crib, to form them into a loop, to hold them while their ends are turned and projected through the loop, to form a knot, and to permit the knot thus formed to escape. The projection of the ends of the cord through the loop formed by the forceps is effected by a finger, $h$, which projects from the front end of a finger-stock, $h$; and

in order that the ends of the cord may be tightly stretched across the loop, to insure their being caught and pushed through by the end of the finger, their passage between the prongs of the
836 fork $n$ should be slightly retarded by a spring, $n'$, which bears against them. The finger-stock is constructed to slide toward and from the crib in slots formed in the standards $h^2$ $h^2$. It is moved to and fro at the proper moments by means of a cam, $h^3$, and spring, $h^4$. The cam $h^3$ is secured to the cam-shaft M, and acts upon a treadle, $h^5$, on whose lower face the spring bears. This treadle is connected by a rod, $h^6$, with the shorter arm, $h^7$, of an elbow lever, which is pivoted to the side rail of the frame, and whose longer arm, $h^8$, is forked and embraces a wrist-pin, $h^9$, that projects from the side of the finger-stock. The cam in turning depresses the treadle $h^5$ and forces the finger $h$ forward to push the ends of the cord through the loop. When its projecting portion has passed the treadle shoe, the treadle is raised by the spring beneath to withdraw the finger to its first position.

Those sections $b^4$ of the outer ribs of the crib which form the gate to permit the escape of the bound sheaf are all linked together by a connecting-rod, R, so that they are compelled to turn simultaneously upon their hinges. This connecting-rod is connected by a link, R′, with the upper extremity of an arm, $R^2$, that is pivoted transversely to the outer extremity of a rock-shaft, $R^3$. The latter extends inward across the frame of the crib, and is fitted at its inner extremity with an arm, $R^4$, (shown in detail at Figs. 23 and 25,) which is connected by a rod, $R^5$, with a slide, $R^6$. The latter is supported in slotted standards $R^7$, secured to the frame of the binding mechanism and moved longitudinally to rock the shaft $R^3$, and thus turn down to depress the sections of the gate by means of a cam, $R^8$, upon the cam-shaft, acting upon a shoe, $R^9$, upon the slide. The rock-shaft $R^3$ is turned back to its first position, and thus turns up the sections of the gate by means of a spring, $R^{10}$, Fig. 4, which, being connected with an arm, $R^{11}$, secured to the rock-shaft $R^3$, is extended whenever the slide $R^6$ is moved by the cam, and as soon as the cam ceases to act contracts again to move the rock-shaft, the gate, and the slide to the positions which they severally occupied before the cam began to act.

In binding the sheaf it is necessary that that portion of the cord which encircles it should be severed from the rest. This severing is effected at the proper moment by a pair of shears, one blade of which is stationary and the other is movable. The stationary blade S is secured to a standard, S′, in such a position that the cord-feeder O can move to and fro above its edge. The movable blade or knife $S^2$ is secured to a stock, $S^3$, which works up and down in a slot in a bracket, $S^4$, that projects from the standard S′, which supports the fixed blade S. The lower extremity of this stock is connected with a compound treadle, $S^5$, which is depressed by a cam, $S^6$, and raised by a spring, $S^7$. The object of using a compound treadle is to obtain the requisite motion with a comparatively slight angular movement of the cam. The back of the movable blade $S^2$ is firmly secured to the stock $S^3$. Its front is received in a groove formed in

the standard S′, by which it is guided in moving. The cutting-edge is formed upon the lower side of the blade. When the stock is raised this edge is sufficiently above the track of the cord-feeder to permit the latter to move freely beneath it. The cutting-edge of this blade is inclined in order to produce a drawing cut, and this drawing action is enhanced by permitting the stock to move laterally in its slot in the bracket, while at the same time a too great movement is prevented by the action of the spring $S^8$, which tends constantly to press the blade $S^2$ toward the grooved standard in which its front side slides.

To protect the cord from being drawn against the knife and severed while running from the cord-feeder, a rounded guard-bar, $S^{10}$, Fig. 10, is placed between the knife and the crib a little above the track of the cord-feeder, so that as the cord is taken off by the nippers it is held down by the bar until it has passed the knife.

The various cams upon the cam-shaft bear a mutual relation to each other, so that they actuate the instruments to which they give motion in their proper relative order. As they are all secured to the same cam-shaft, they are turned simultaneously by its revolution. The cam-shaft is fitted with a cog-wheel, M′, whose teeth engage with those of a pinion, $M^2$, secured to a sleeve, $M^3$, above. This sleeve is fitted with a second wheel, $M^4$, whose teeth engage with those of a second pinion, $M^5$, which is secured to a shaft, $M^6$. This shaft is supported by the standards $M^7$ of the frame of the binding mechanism. It is fitted with a conical belt-pulley, $M^8$, to which a rotary motion is imparted by a belt that is driven by a corresponding reversed conical pulley, $M^9$, secured to a shaft, $M^{10}$, near the hinder side of the machine. This shaft is driven by a pinion, $M^{11}$, which gears into an intermediate wheel, $M^{12}$, which in turn gears into the main driving cog-wheel D. The object of the intermediate wheel is to permit of the raising and lowering of the carriage-frame upon the running-wheels without breaking the connection between the toothed driver D and the pinion $M^{11}$. In order that the intermediate wheel may move to accommodate itself to this change in the relative positions of the driver and pinion, it is pivoted in a swinging frame T, which permits it to rise and fall with the depression and elevation of the frame of the machine, and at the same time holds it in the proper position for engaging with the teeth of the pinion. The swinging frame T is constructed to turn upon the pulley-shaft $M^{10}$ as an axis, and is secured in any desired position by means of a screw, T′.

The pulley-shaft $M^{10}$ is fitted with a pulley, U, from which a belt is conducted to the corresponding pulley U′, secured to a counter-
837 shaft, $U^2$, near the front of the machine, which is thus caused to revolve by the rotation of the driving-wheel D. This counter-shaft is fitted with a second pulley, $U^3$, from which a belt is conducted to a pulley, $U^4$, upon the crank-shaft $H^7$, which operates the sickle. It is also fitted with a third pulley, $I^4$, from which a cord is conducted to the pulley $I^3$, secured to the shaft of the reel $I^2$. The upper roller, $J^5$, of the inner conveyer-apron is caused to revolve by a belt or cord that encircles pulleys $J^{21}$ $J^{22}$, secured respectively to the crank-shaft and to the roller-shaft. The

upper roller of the outer conveyer-apron is driven from the inner one by means of a pair of cog-wheels, $J^9$ $J^{10}$, secured to the shafts of the two. And, finally, the inner roller of the raking-bands is driven by cog-wheels $J^{23}$ and $J^{24}$, secured respectively to its shaft $J^2$, and to the shaft of the adjacent roller $J^8$ of the conveyers-apron, so that all the acting members of the machine are caused to move by the revolution of the driving-wheel C.

We have already described the operation of the sickle, the rake, and the conveyer in treating of these several apparatus. We have also traced the cut grain to its delivery upon the elevator-platform, and to its stoppage there by the action of the platform-gate. It remains for us to describe the operation of the binding mechanism.

In commencing this description we will suppose that a bound sheaf has just been discharged from the machine, that the discharging-gate $b^4$ has closed, and that the compressor L is in the position to which it was allowed to rise under the action of the compressor-springs, to leave the bound sheaf free to pass out of the discharging-gate. The cam-shaft is at this time in such a position that the compressor-cam is acting upon the friction-roller L′ at the point. Consequently, as the cam-shaft turns in the direction indicated by the arrow in Fig. 33, the sliding bar is raised and the compressor correspondingly depressed. When the compressor reaches the lower extremity of its downward stroke it is held stationary for a short period by the action of the concentric portion *i* of the compressor cam. During this period the cam-shaft continues to turn, and the pair of nippers *e* are opened by the action of the appropriate cam $e^{13}$. As soon as the pair of nippers have opened, the cord-feeder O is projected forward to feed the extremity of the binding-cord between the nipper-jaws. When this is effected, the pair of nippers *e* are permitted to close under the action of the nipper-springs and gripe the cord firmly. The moment this is accomplished the clamp P is raised by its cam $P^5$ to free the cord in the cord-feeder. The compressor L is then permitted to rise to its highest limit. As it rises it draws off the cord from the spool N, which, in turning, winds up the spool spring $N^9$, thus keeping a constant strain upon the cord drawn off. As the compressor approaches its highest position the extremities of its beam, striking the lower sides of hooks $K^{10}$ which project from the outer extremities of the radius-bars $K^2$ of the platform-gate K′, carry this gate up with the compressor, and thus permit the grain that has accumulated upon the platform B′ during the formation of the preceding sheaf to slide into the crib. As the grain enters the crib it deflects the binding cord, as shown in Fig. 3, previously extended downward in a straight line from the pair of nippers to the binding mechanism, and which now, as shown by a crooked line in Fig. 3, extends outward from the pair of nippers, down the outer side of the grain fallen into the crib, and thence inward beneath the same, and through the forked standard *n* to the cord-feeder O. This deflection is accompanied by the unwinding of more cord from the spool, and consequently a still greater winding up of the bobbin-spring. The compressor is permitted to remain at its highest position a sufficient

length of time to permit the passage of the mass of grain from the platform to the crib by the shape of that portion of the compressor-cam which is acting at the time. This portion *i* of the cam is concentric, so that, although the cam-shaft turns without interruption, no motion is imparted by this portion of the cam to the sliding bar $L^2$. When the mass of grain has passed into the crib, the compressor is depressed. As it descends to compress the grain, the platform-gate is lowered to shut off the passage of grain from the platform, as continually fresh quantities are being delivered thereon by the continuous action of the sickle, the rake, and the conveyor. As the compressor continues to descend, the slack of the binding-cord, caused by the approach of the pair of nippers to the binding mechanism, is rewound upon the spool as fast as formed by the action of the spiral spring $N^9$, so that when the compressor approaches its lowermost position the cord is strained by the force of the spring around the compacted grain. The pair of nippers *e* is held in such a position by the stock from which they project, that in descending with the compressor, they pass on the inner side of the forked standard, so that the extremity of the cord held by them is strained across the forked standard *n*, and lies upon that portion extending from the cord-feeder O, while the forked plate $e^5$, which is secured to the outer side of the nipper-stock, passes down the outer side of the forked standard *n*, and, embracing the cord extending from the pair of nippers to the grain between their two prongs, prevents it from rising or moving laterally. The compressor does not descend at once to its lowest limits, but stops when the bottom of the nipper-stock strikes the upper extremity of the forked standard *n*, and remains stationary a short period in this position to give time for the seizing of the cord by the tying-forceps *f*, which have been opened by the action of the appropriate cam during the descent of the compressor. The tying-forceps are now advanced into the forked standard, the upper jaw passing above and the lower jaw passing beneath the two extremities of that portion of the cord
838 around the sheaf which have been stretched across the standard. As soon as the forceps have advanced sufficiently to receive the cord in the notches *v*, their jaws are closed by the closing-lever. They are then drawn back a distance about equal to their diameter, and at the same time the compressor is depressed still farther to lessen the circumference of the sheaf, and thus permit the cord to be drawn along by the forceps. When the latter have reached their backward position they are turned three-quarters round by the action of the toothed sector $f^{17}$ upon the forceps pinion $f^{18}$, thus twisting the loop form by their backward movement and causing the cord to cross their forked extremity. The forceps are then advanced through the forked standard to push forward the loop formed in it until it arrives opposite the extremity of the finger *h*, and as this movement takes place the cord is severed by the action of the shears S $S^2$ just in front of the cord-feeder O. The jaws of the nippers *e* are also opened at this time to release the extremity of the cord which they had previously seized. By this advance of the forceps the extremities

of the cord or band around the sheaf, which are on the inner side of the forceps, are received into the groove $v'$ in the side of their jaws, and are moved directly across the front notched extremity of the finger $h$. The latter is then advanced to push these extremities through the loop of cord in the forceps, thus completing the knot. As soon as the finger has completed its work, it is withdrawn to its first position. As it leaves the forceps, the latter are retrograded a short distance to bring the slack knot to the middle of the forked standard, and are turned the remaining quarter of a revolution. They are now permitted to open by the rising of the closing-lever $g^4$, and at the same time the compressor is permitted to rise and release the grain. The latter tends to expand from its compressed form, thus straining the band, drawing its knotted extremities from the open tying-forceps, and tightening the knot. The bound sheaf in its expansion presses against the inner ribs, starts itself outward, and rolls laterally out of the opening left by the discharger-gate, which has meanwhile been depressed by the action of its appropriate cam.

While the knot has been forming the thread-clamp P has been permitted to reclamp the thread in the cord-feeder O. The spool-spring N⁹ has also been disconnected from the spool to permit it to assume its relaxed state, after which it has again been connected therewith. While the sheaf is rolling out of the machine the tying-forceps are closed and are turned back a complete revolution, to be ready to act again, and after the sheaf has escaped the discharging-gate is raised again to close the opening in the side of the crib.

The operations we have described have been effected by a single revolution of the cam-shaft and the several members of the binding mechanism have attained the proper positions for commencing the binding of a new sheaf, the first operation being the descent of the compressor and the seizing by the pair of nippers $e$ the end of the cord presented by the cord-feeder O.

As some of the operations we have described are effected simultaneously with others, we have prepared the diagram Fig. 8, which shows the relative angular distances through which the cam-shaft moves to perform the various operations and the order in which they are effected.

The various parts of the machine we have described may be modified to a very great extent without overstepping the limits of our invention; and we have devised numerous modifications, some of which may by different constructors be deemed preferable to those we have thus far described. We will therefore proceed to indicate briefly such of these modifications as we believe to be the best.

The sickle may be modified by constructing the blades of flat plates, which may be conveniently formed by grooving a plate of steel in a planing-machine and cutting it, either obliquely or at right angles to the grooves, into blades of a suitable width, which are then secured to the stocks. When formed in this manner, it will have the section represented at Fig. 34, the ribbed or grooved surfaces of the blades being outside and meeting at a sharp angle

to form the compound cutting-edge. The grooves on the two blades may be inclined in opposite directions to the edge. The method we have described of forming ribbed sickle-blades, whose serrated cutting-edges are renewed by simply beveling off the front edge on the smooth side, may also be applied to sickles with single blades.

The advantages we have stated as resulting from the compound jumping movement we have described may be attained to a certain degree by dividing the movement between the two blades of the compound sickle. Thus, for example, the upper blade may be arranged to move to and fro with a succesion of short vibrations, while the lower one is moved simultaneously to and fro beneath the upper, but with longer and slower strokes, or the relative movements of the two may be reversed. The mechanical devices for communicating this compound movement to the sickle-blade may also be varied. Thus, for example, eccentrics may be used in place of cranks, and instead of using an elbow-lever pivoted to a swinging arm the latter alone may be employed. In this case the connecting-rod should be joined near its middle, and be deflected alternately up and down or to the right and left, so as to vary its effective length, and thus produce short vibrations, while the swinging arm is imparting to it a longer and slower stroke. Such an arrangement is shown at Fig. 35. The same compound movement may be produced by the rotation of a single shaft instead of employing two for the purpose. A very convenient way of
839 effecting this object is to apply an eccentric toothed cam to the shaft, the blade or connecting-rod being kept in contact with the cam by a spring, as shown in Fig. 36.

Instead of adjusting the cutting-blade upon its stock to bring its cutting edge into the proper position with respect to the stubble-guard and shield, the blade and stock may be moved forward together, or the shield or stubble-guard, or both, may be made adjustable for the purpose of setting them and the knife from time to time into the proper relative positions.

The water for moistening the sickle-blades may also be applied to their outer or inner surfaces, or to both. We consider this portion of our invention of great practical importance, as it prevents the "gumming," as it is commonly called, of the sickle, which has proved to be one of the greatest impediments to the successful cutting of grass and grain by machinery. The water prevents the gummy matter from drying, and dissolves and washes it from the sickle. This water may be applied in various ways, and may also be used in a hot state by making the reservoir in the form of an annular boiler having a small furnace within it.

It may also be found advisable to dissolve alkalies or other substances in the water to augment its cleansing properties. Substances may be used which will act to saponify the gummy matter, and also to convert it into a lubricating compound, which will facilitate the movement of the sickle-blades. In such cases, however, the sickle and other portions of the machine connected therewith, should be carefully washed at the close of each day's work to prevent them

from rusting. The upper blade may be perforated to allow the water to ooze through it from within to keep its upper surface wet.

The raking mechanism may be driven directly from the shaft, instead of through the conveyor, by means of a suitable belt and belt-pulleys, or by shafting and cog-wheels, or by shafting, the sections of which are connected by universal joints, as may be deemed most suitable. It may also be found advisable to support the upper members of the raking-bands at points between the two end rollers upon intermediate rollers. The rollers may also be divided transversely into sections whose adjacent extremities are supported by intermediate bearing-rails inserted between the front and back rail of the raking-platform. It may also be found advisable to stud the bands with teeth to prevent the slipping of the grain.

The conveyor may be modified in various ways. Thus, for example, the bands may, by means of suitable rollers, be made to assume the configuration of the mold-board of a plow, and thus receive the grain horizontally and deliver it upon end, by which means the sheaf may be formed upright instead of horizontally.

The raking and conveying bands may also be connected, so that the same bands extend from the extreme roller of the raking apparatus to the extreme one of the conveyor. Such an arrangement may be expedient in a machine in which the grain is to be conveyed horizontally, but whenever the direction of movement is changed so as to require the deflection of the bands, we think it best to divide the raking and conveying bands at the point of deflection, as we have done in the machine we have described.

The elevator, instead of being composed of a series of independent endless bands, each armed with a series of teeth, may be made of an endless series of rake-heads linked together and carried around in endless succession on drums, as shown in perspective at Fig. 36$^{A}$.

The elevated platform instead of being stationary and permanently inclined may be supported on pivots, and arranged to tip the grain received upon it into the binding-crib. This tipping should be effected at the proper moment by means of a cam upon the shaft of the binding mechanism. Such an arrangement may be deemed advisable by some constructors, as it dispenses with the necessity of employing the platform-gate to shut off the passage of the grain to the crib, which operation may be effected by simply bringing the platform to a horizontal position. The pivots of such a tipping platform may be arranged either near the middle of its sides or near its upper or lower edges, as may be deemed advisable. By constructing the tipping platform as shown in Fig. 36$^{B}$, it may be used both as a conveyer and platform. When its inner curved edge is depressed, it will receive the grain from the rake, and when raised up, as shown by the red lines in Fig. 36$^{B}$, the grain will slide off into crib to be bound.

The platform-gate in the machine above described is constructed to rise and fall. Such a gate may in many cases be replaced with advantage by a rotating gate consisting of two or more series of arms projecting radially from a common axis, which is turned at intervals, but always in the same direction, to move one set of arms

out of the way of the grain and to bring a fresh set into a position to act when the grain has passed into the crib. Such a gate will be similar to that of the ordinary turnstile laid upon its side. It may be arranged to act not only as a mere gate, but also as a feeding apparatus to drive the loose grain quickly into the binding-crib. The compacting of the grain may be effected by compressors of various forms and arrangement, but all of which produce the same result—that is to say, the compacting of the loose grain into a bundle or sheaf. The various modifications we have devised for effecting this purpose are so numerous that it would be impossible to describe them all within the limits of this specification. We will, therefore, specify those only which we deem it most important that constructors of these machines should be made acquainted with.

Instead of employing a compressor which extends unbroken throughout the whole length of the binding crib, a compressor
840 of sections may be employed. Thus, for example, the compressor may be composed, as shown at Fig. 38, of two crutched-formed levers, which are pivoted by their butts at the opposite extremities of the crib, and which are turned up to admit the grain and release the sheaf, and are turned down to effect the compression. In this case, as in that of others we shall mention, it will be advisable to operate the pair of nippers by a separate arm, as shown at Fig. 39, which projects from a rock-shaft.

The compression may also be effected partly from above and partly from beneath, and this method admits of numerous modifications. Thus, for example, the bottom of the crib may be formed of ribs secured to a beam similar to the present compressor, and this movable bottom may be made to rise either simultaneously with the descent of the upper compressor or subsequent thereto; or the compression may be effected by two series of curved arms attached to separate rock-shafts, as shown at Fig. 40, in which case the operation will be analogous to that of compressing a sheaf by the human arms. In order that these mechanical arms may act efficiently, their extremities should be extended sufficintly to enable them to embrace enough grain in a loose state to form a sheaf, and those in one set should be arranged to pass by those of the other in closing upon the grain to effect the compression. This arrangement of compressing-arms may be modiffed by arranging the rock-shafts of the two sets at opposite sides of the crib; or one set of arms may be used in the place of the rising and falling compressor we have before described.

The compression may also be effected wholly from beneath by reversing the arrangement of the crib, closing it at the top with curved ribs and inverting the compressor. In this case the grain received upon the compressor will be raised and compacted against the stationary curved ribs which close the top of the crib. This arrangement is advantageous from the facility with which the discharge of the bound sheaf may be effected, for the ribs of the compressing-beam may be secured to the extremities of standards, and projected upward between inclined discharging bars, as shown in

Fig. 41. In this case, the compressor, in descending, will leave the sheaf upon the bars, as the ribs are drawn down between them, and no discharging gate will be required. The loose grain, however, must not be admitted into the crib until the compressor has raised sufficiently to close the opening through which the sheaf has passed.

Instead of actuating the compressor by means of a single cam, two cams may be used, which act in succession—one to give the quick movement to the compressor when but little resistance is to be overcome, and the other to act when a great compressing force is to be exerted with but little motion.

The different mechanisms we have described for effecting the compression may be varied by combining parts of each. Thus, for example, the inverted compressor we last described may be replaced by one set of the curved arms, represented at Fig. 40. The stationary ribs, which form the top of the ribs, may also be replaced by a second set of curved arms, which, in this case, may be made to perform the duty of a gate to shut off the supply of grain from the platform or conveyor during the formation of the sheaf.

The compressor may also be constructed in such manner that it performs the duty of conveyor as well as its own peculiar functions. Thus, for example, it may have the form of a hand-rake, as shown at Fig. 42, which, advancing toward the farther extremity of a platform upon which the grain is delivered by the raking apparatus, passes over the grain and descends beyond it, after which it, in its retrograde movement, draws the grain backward and compresses it between its curved teeth and a series of stationary teeth, or the equivalent thereof, which form a binding-crib.

The compressor may also be made to perform its duty by compressing the grain horizontally, and some of the devices we have mentioned are well adapted to this method of operation. Such a compressor may, however, have the form of a series of large forceps with curved jaws, as shown at Fig. 43, which are opened to admit the grain and closed to compress it. This arrangement may be varied by inverting these forceps and arranging them to travel from the platform on which the grain is delivered by the rake to the point at which the sheaf is discharged, so that it may open, descend upon the mass of grain, embrace it, compress it, and hold it during the binding, after which it may deliver the bound sheaf at the side or back of the machine.

Again, a horizontal compressor may consist of two series of ribs, which, as shown at Fig. 44, are arranged to move in doubly-curved lines, so that they are forced to assume in succession the positions in which they are represented in red, black, and blue lines in the figure, and thus open, compress, and drop the sheaf.

The discharging of the bound sheaf may not, in some cases, be effected with sufficient speed when this is done solely by its own weight and elasticity. In such cases we propose to eject the sheaf from the binding-crib by means of suitable mechanism, which may either be operated by a cam on the cam-shaft of the binding mechanism, or by some independent apparatus which produces the wished-for result at the proper moment. Thus, for example,

a horizontal piston-crutch may be arranged to traverse the lower portion of the binding-crib, as shown at Fig. 45; or the lower portions of the inner ribs of the crib may be connected with a rock-shaft; as shown at Fig. 46, and turned outward to eject the sheaf. The same result may be attained by forming the bottom of the crib of crutch-shaped ribs, which are all connected to a horizontal beam or shaft, as shown
841 at Fig. 47, so that by turning the shaft outward the sheaf lying upon its ribs will be thrown from the machine, after which the shaft must be turned back again to aid in the formation of a new sheaf. This arrangement may be varied by attaching a series of such crib-bottoms to a shaft, as shown at Fig. 48, and turning the latter at intervals and always in the same direction, by which means one crib-bottom and the sheaf thereon will be moved out of the crib, and the next succeeding crib-bottom in the series will be brought into a position to receive the grain. A discharger of this description may be varied to perform not only its own peculiar functions, but also to effect the compression of the grain. Thus, for example, the extremities of the ribs may be prolonged and curved, as shown at Fig. 49, so that each series may seize the grain in succession and compress it against a series of arms, which, being subsequently withdrawn, will permit the further turning of the ribs to eject the sheaf from the machine. Again, this arrangement may be varied by combining the rotating discharger with a rotating compressor, the two having the general form of two wheels of comparatively small diameter and great breadth, which, as shown at Fig. 50, turn like a pair of crushing rolls upon parallel shafts or axes, so that their arms form cells in which the loose grain is received and compressed, and from which the bound sheaf is permitted to drop.

We have already stated that the cord-nippers may be operated by a separate arm, instead of connecting it with the compressor; but the method we have described of effecting the surrounding of the sheaf with cord, by causing the grain to pass across the track of the pair of nippers, may be replaced by others. Thus, for example, the pair of nippers may be secured to the arm of a crank which is caused to rotate round the grain. Such an arrangement is shown in Fig. 51; or a jointed arm like that shown in Fig. 52 may be employed to produce the same result. Such an arm may be composed of wedge-formed links jointed together at their larger ends, and connected by a cord at their small ends in such manner that when projected from a case it shall assume a curved form and carry the band round the sheaf. Instead of carrying one cord entirely around the sheaf, two cords may be employed, each of which passes halfway round, and which are united by knotting their extremities on opposite sides of the sheaf.

The opening of the pair of nippers may be effected by a descending wedge-block instead of one moving horizontally, or nearly so. The wedge-block may also be secured to a straight bar and be moved in a straight line instead of in a curved line; or the pair of nippers may be opened by a pair of diverging levers, or they may be opened

by twisting a bar between them, or by means of toggle-joint levers placed between them, and by various other contrivances too obvious to need description.

The various members of the binding mechanism may be varied to an almost endless extent. Thus, for example, the relative positions of the cams and treadles may be reversed, the latter being arranged above the former. Such a modification of the arrangement of the cam and treadle of the cord-feeder is shown in Fig. 53. Spiral springs may also be used in the place of plate-springs, as represented in the same figure; or springs of India-rubber or wood may be employed, if deemed most suitable. The treadles may also be arranged at the sides of the cams, an example of which is shown at Fig. 54.

Again, the return movements of the various members of the binding mechanism may be effected by cams as well as the direct movements, or the cams may give to the levers a double movement, as shown *as* Fig. 55. Such a modification, if applied to all, will require double the number of cams.

The cam-shaft also, in place of being parallel in direction with the shafts of the running-wheels, may be at right angles or oblique thereto, but such an arrangement would require the employment of beveled gear or guide pulleys or their equivalents to change the direction in which the driving belts run.

The machine we have described is adapted to binding each sheaf with a single band; but it will be obvious to the skillful mechanic that the binding mechanism may be modified to bind the sheaf with two or more bands without increasing the number of cams, and by merely duplicating some of the other parts of the mechanism. Thus, for example, if two bands are to be tied, two forceps will be required, and these may both be moved simultaneously by the same cam and counter-spring.

The construction of the forceps may be varied to a great extent. Thus, for example, the jaws may be formed in one piece with the spring, which causes them to diverge or open, as shown at Fig. 56, where the thin curved connection constitutes the spring; or the jaws may be pressed toward each other by this spring connection, and opened by a reciprocating wedge-block working within them, as shown at Fig. 57; or the reciprocating wedge-block may be arranged to act at right angles with the forceps. Again, the two jaws may be formed with shanks, which are pivoted near their middles to the extremity of the sliding rod or stock to which they are secured.

The closing-lever may be replaced by a pair of levers acting like the jaws of a pair of tongs, and embracing the forceps-jaws between them, or by a ring which is moved to and fro upon the forceps to press their jaws together.

Having thus described our improvements in machines for cutting, raking, and binding grain, together with various modifications of which the same are susceptible, what we specifically claim is—

1. The combination of a continuously-acting rake with a binding mechanism acting intermittently, substantially as herein
842 set forth, which, among other things, gives the director of the

machine an opportunity to observe the rate at which the grain for each sheaf is accumulating, so that by hastening or retarding the operation of the binding mechanism, by shifting the belt on the cone-pulleys, he can make the sheaves nearly of uniform size.

2. The method of compressing the loose grain into sheaves vertically instead of horizontally, whereby, among other advantages, the lateral dimensions of the machine are considerably diminished, which adapts it the better to running between stones and other obstructions, and enables it to cut the outside swath round a field with less trampling and waste of the grain.

3. The shifting conveyer, by means of which sheaves of varying length may be bound round the middle without changing the relative positions of the cutting and tying machine, substantially as herein set forth.

4. The combination, in a grain-harvester, of the two series of bands, one or both armed with teeth, for the purpose of carrying the grain from the rake to the binder, as herein set forth.

5. The combination of a shifting stripper with a conveyer, substantially as herein set forth.

6. The combination of the discharging-gate, or the equivalent thereof, with the receiving-platform and the binding-crib, substantially as herein set forth.

7. The traveling cord-nippers *e*, or their equivalents, operating substantially as herein set forth.

8. The combination of the cord-clamp P with the cord-feeder *o*, substantially as herein set forth.

9. The method, substantially as herein set forth, of drawing the binding-cord round the sheaf with the proper degree of tightness preparatory to tying, by means of a spring operating upon the cord-spool, substantially as herein set forth.

10. The traversing movement of the tying-forceps in alternately opposite directions, in combination with their opening and closing movement, whereby the two ends of the band may be laid together and may then be grasped by the forceps to be tied, thus dispensing with a finger to thread the cord through the eye of the forceps.

11. The pronged standard *n*, in combination with the tying-forceps *f* and the finger *h*, or their equivalents.

12. The method of rendering slack cord to facilitate the tying of the band by lessening the diameter of the sheaf as the cord is taken up in making the knot.

13. The arrangement of the cord-nippers upon a sliding stock pressed down by a spring which yields to allow the stock to stand still while the compressor which carries it is moving, substantially as herein set forth.

14. The retarding of the cord by means of a brake, or the equivalent thereof, applied at some point between the place at which the knot is tied and the extremities of the cord, to insure the stretching of its ends across the loop preparatory to their projection through it in the operation of tying the knot, substantially as herein set forth.

15. The arrangement of the sides and bottom of the binding-crib so that it can be depressed to permit the discharge of the sheaf, substantially as herein described.

16. The arrangement of the cutting and binding mechanism on opposite sides of the driving-wheel, substantially in the manner and for the purposes herein set forth.

In testimony whereof we have hereunto subscribed our names.

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E. S. RENWICK.

Witnesses:

S. W. WOOD.
JOHN L. SMITH.

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GRAIN-BINDER.

No. 188,125. Patented March 6, 1877.

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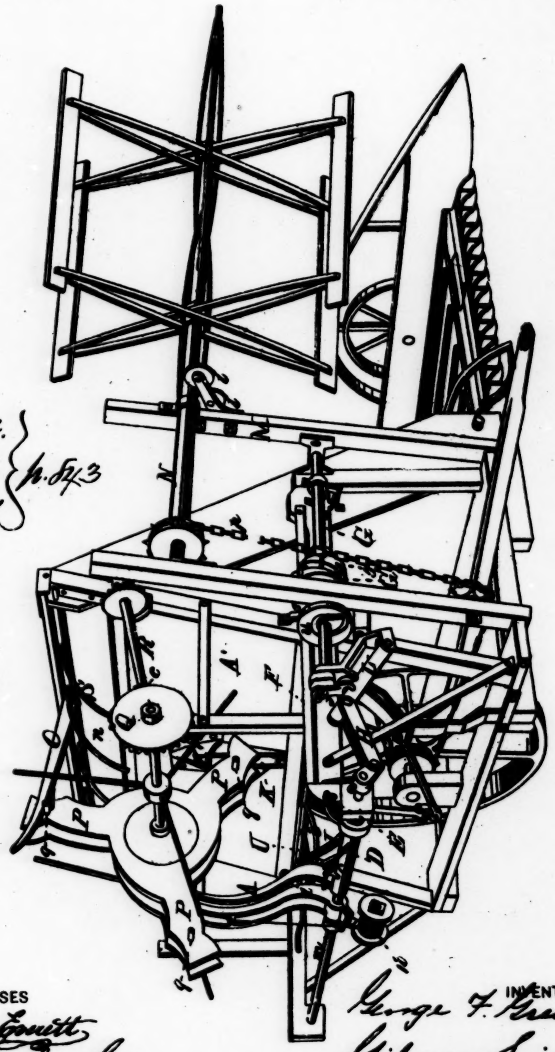

Fig. 1.

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Fig. 2

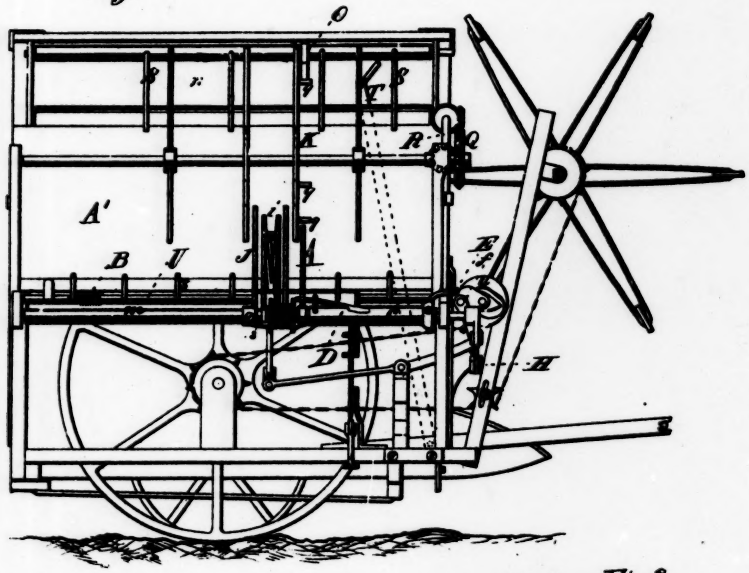


Fig. 8.

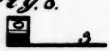

Fig. 9.

Fig. 6.

Fig. 5.

Fig. 4

Fig. 3.

Fig. 7

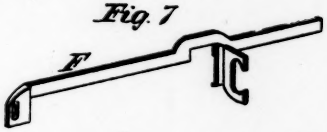


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Fig. 10.

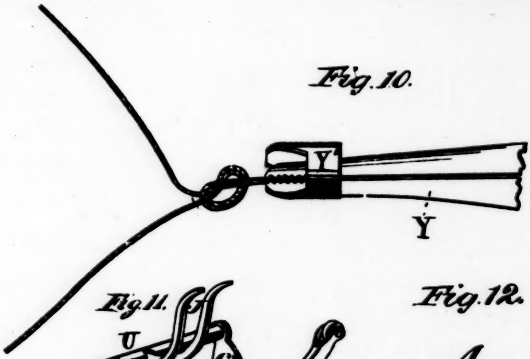


Fig. 11.

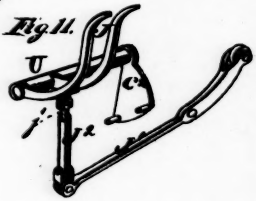


Fig. 12.

Fig. 13.

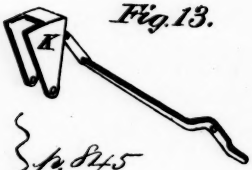


Fig. 14

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Fig. 15.

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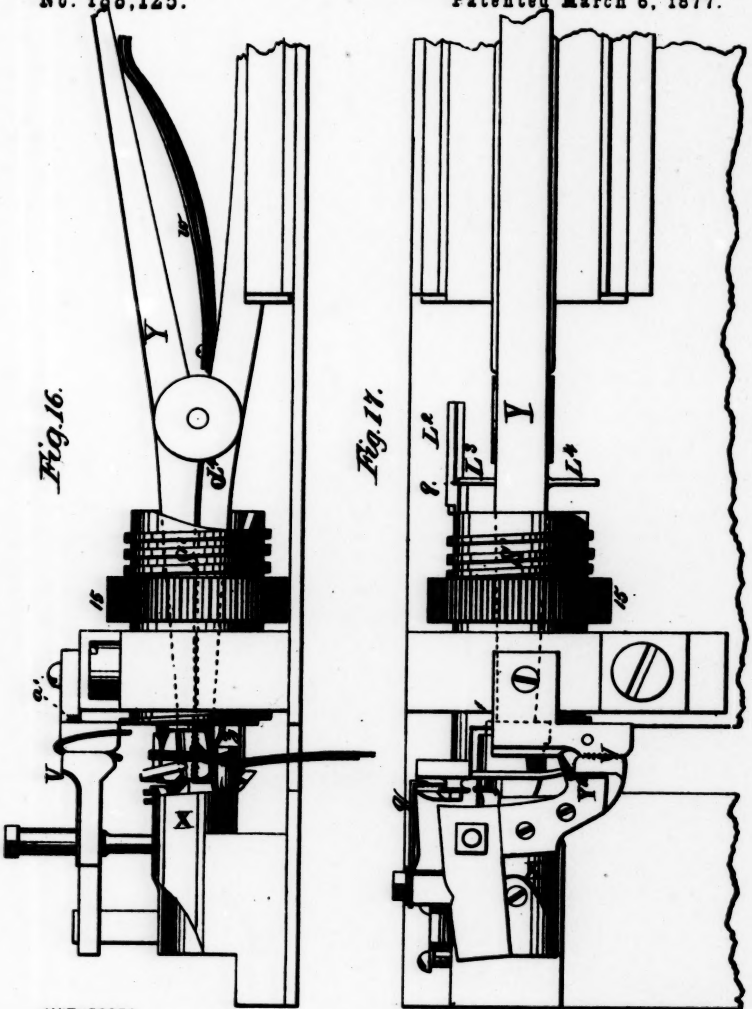


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Fig. 18.

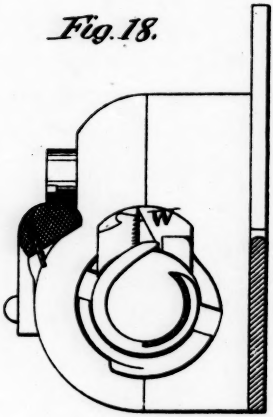


Fig. 19.

Fig. 20.

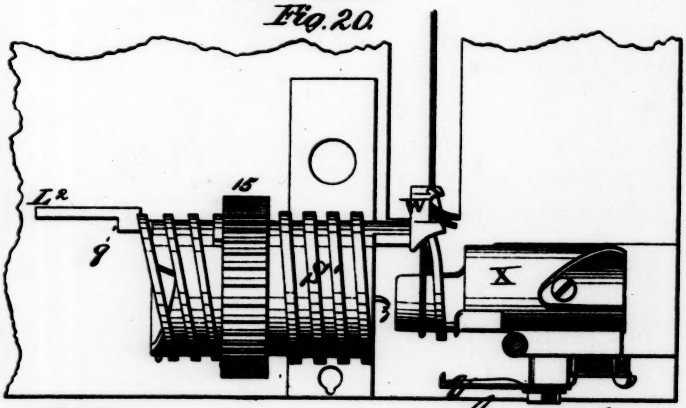


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Fig. 21.

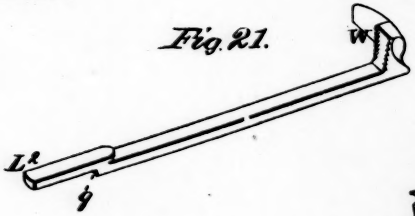



Fig. 22.

Fig. 23

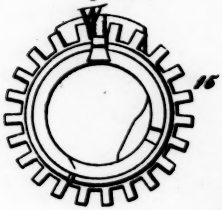



Fig. 24.

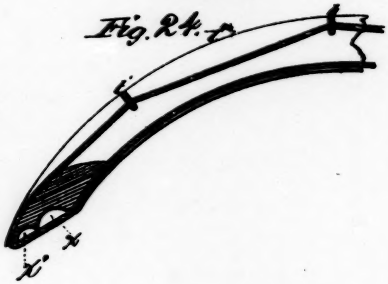



Fig. 25.

Fig. 26

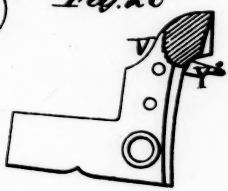
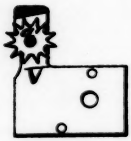



Fig. 27.

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No. 188,125. Patented March 6, 1877.

Fig. 28.

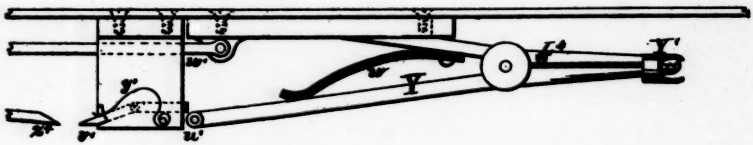

Fig. 29.

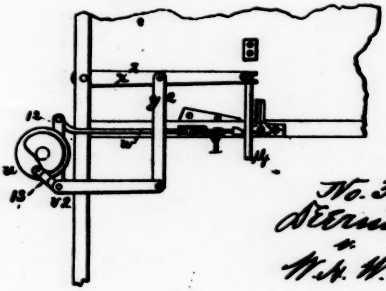

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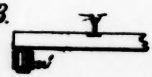
Fig. 30.

Fig. 31.

Fig. 32.

Fig. 33.



WITNESSES
Robert Everett
C. Rg. Tearle.

INVENTOR
George F. Green.
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ATTORNEYS

850 UNITED STATES PATENT OFFICE.

GEORGE F. GREEN, of Kalamazoo, Michigan.

*Improvement in Grain-binders.*

Specification forming part of Letters Patent No. 188,125, dated March 6, 1877; application filed May 5, 1876.

To all whom it may concern:

Be it known that I, George F. Green, of Kalamazoo, in the county of Kalamazoo and State of Michigan, have invented a new and valuable improvement in grain-binding harvesters; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, and to the letters and figures of reference marked thereon.

(Here follow diagrams marked pp. 843 to 849, incl.)

Figure 1 of the drawings is a representation of a perspective view of my grain-binder; and Fig. 2 is an end view of the same. Figs. 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 15 are detail views. Fig. 16 is a plan view of the binder; and Fig. 17 is a front elevation of the same. Figs. 18 and 19 are details, and Fig. 20 is a side view, of the binder; and Figs. 21, 22, 23, 24, 25, 26, 27 are detail views thereof. Figs. 28 and 29 show means for actuating the binding and tying devices. Figs. 30, 31, 32, and 33 are details.

This invention has relation to means which are designed for binding grain automatically without the necessity of employing manual labor, and which is an attachment to harvesters.

Wire for binding grain is objectionable on account of serious difficulties growing out of the fact that portions of the wire are left in the straw during the operation of separating the bundles.

The main object of my invention is to automatically tie the bundles of grain with a string or cord, and to leave the bundles tight.

The nature of my invention consists, first and mainly, in mechanism which I shall hereinafter explain, which will automatically gage or regulate the size of the bundles of grain, whether the machine be cutting light or heavy grain, bind the bundles by means of a cord, and discharge the same from the machine, as will be hereinafter explained.

The invention further consists in novel means whereby a bundle of grain is compressed, and while compressed a cord is passed around it and tied automatically, leaving the bundle tightly compressed.

The invention further consists in intermittently-rotating dividing-arms, a vibrating divider, and a binding-arm, in combination with means which will tie a cord about a compressed bundle of grain, substantially as will be hereinafter explained.

My invention further consists in a shield, which is combined with a divider and a vibrating cord-carrying arm, whereby in the act of moving the cord to the tying devices a free space is formed for the passage of said arm.

My invention further consists in the employment of mechanism for tying the cord about the bundles, of griping-jaws, one pair of which is caused to rotate about a tube previous to the operation of the gripers, which grasp the cord and finish the tie.

Other features which I shall adopt in carrying my invention into effect will be understood from the following description:

In the annexed drawings, A designates a starting arm or lever, (indicated in Figs. 1, 2, and 9,) which has a cam, 2, on its under side that lifts a spring latch, 3, (indicated in Figs. 2 and 8,) from a shoulder or catch, 4, (shown in Fig. 6,) thereby loosening the tube *c* on shaft *m*, so that the force exerted on lever A is transmitted through the tube *c* by means of a spring, D, to a crank, E, thereby actuating a bar, F, and bringing the sliding clutch 5 in contact with the clutching-face of a chain-wheel, $G^1$, (represented in Fig. 1,) giving motion to a crank and cam shaft, G, and transmitting motion to the binding devices, and depressing the toggle levers H and L, and bringing down the binding-arm *i* with its cord 10, (shown in Fig. 1,) moving forward the divider K, also moving up the compressing arms J, and also operating the knot-tying mechanism.

As shaft G (shown in Fig. 1) rotates with the crank-pin on this shaft it brings up the toggle-levers H and L, giving a motion to the shaft *m* that lifts the binding-arm *i*, allowing latch 3 to enter the catch 4, Fig. 6, which, through bar F, throws a clutch, 5, out of gear from the chain-wheel on the shaft G, allowing said wheel to run as an "idler" until enough grain is elevated and deposited into the receiver *n* to lift the fingers S high enough to disengage catch-arm O from its pin on one of the divider-arms P, when the weight
851 of grain will cause said arm to descend until the mutilated spur-wheel Q with its cogs comes in contact with the teeth of a beveled pinion, *e*, on the short shaft R, which forces a divider-arm, P, with its load of grain one-third way around, delivering the grain on top of the supporting-fingers S and into the compressing-arms J which spring from the shaft U, to which fingers S are secured, the free ends of which arms may be curved outward, as represented in Fig. 11.

Each divider-arm P, in its rotation, moves the starting-bar A, thus lifting the spring-latch 3 and transmitting motion through the bar F, that draws the clutch 5 into contact with the chain-wheel G′, heretofore referred to, giving motion to the knot-tying and binding devices hereinafter explained, the grain being delivered beneath the fingers S into the receptacle formed by the dividing-fingers, shown in Fig. 1. The object of the fingers S is to measure the bundles of grain and have them all of an equal bulk, whether the grain in the field be thick or thin.

The wheel Q, which I have above denominated a mutilated spur-wheel, has its teeth omitted at three points, equidistant from each other, so that when a dividing-arm, P, is locked by the latch-arm

O, on the shaft of the teeth S, the shaft R, with its pinion, can rotate freely, without rotating wheel Q, until the grain accumulates under the fingers S, lifting these fingers and the latch-arm O, so as to unlatch divider-arm P and cause the weight of the gathered grain under fingers S to press on dividing-arm P, carrying it down, with its shaft and turning wheel Q, until the pinion on shaft R engages with the teeth on said wheel, causing this wheel to turn until the pinion on shaft R moves the dividing-arms P, so that they change places, pressing the straw, that was previously under the fingers S, down into a receptacle composed of another set of fingers, designated by 8, also onto the compressing-arms J, above referred to. During the rotation of the divider-arms P the studs or anti-friction rollers, designated by 9, near the extremities of said arms, operate on the end of starting-arm A, on shaft *m*, heretofore described, thereby causing clutch 5 on shaft G to engage with the chain-wheel G′, thus setting the binding devices in motion for compressing and tying a bundle of grain. As the binding-arm *i* descends with the cord or string, and passes over the bundle of grain, the shield or divider K moves forward, pushing all loose grain in front of it, allowing the binding-arm to enter it at the top, free of all obstructions. A shield or hood, K′, is fastened on a grain-board A′, just above the divider K, which will assist the arms P in dividing the grain preparatory to the descent of the binding-arm *i*, so as to leave a space for the descent of the free end of this arm.

In practice I shall construct the main shafts of the binding apparatus tubular, for the purpose of preventing undue vibration, which would take place if solid shafts were used, owing to the sagging caused by the weight of the same. By using tubular shafts I obtain lightness and all the required degree of strength, and avoid the objection referred to.

T designates a grain-guide, which is pivoted at the lower front corner of the elevator-frame, on the grain side thereof, and which is provided at its upper end with a handle convenient to the driver sitting in his seat.

When cutting tall grain the grain-guide T is not used; when cutting short grain, in order that it may be bound at or near the middle of its length, the driver moves the upper end of this grain-guide T backward against the butts of the straw, so that the elevator will deliver the short grain into the receptacle *n* in a position to be properly bound by the devices I am now about to describe.

These devices consist, first, of rotating gripers; second, of a stationary tube, which is adapted to serve, in combination with the said rotating gripers, as a means for taking up the slack cord around the bundle of grain, and, at the same time, for holding the cord in a position to be grasped by reciprocating gripers, which operate to finish the knot; third, of elongated gripers, which enter the center of the cylinder of the rotating gripers and into the end of the slotted tube, as indicated by dotted lines in Figs. 16 and 17.

Binding-arm *i* is threaded by passing the cord over the top of said arm through eyelet *t*, thence through eyelet *t′*, and finally through a hole made through the free extremity of said arm.

I do not limit myself to the manner herein described and represented for threading the arm *i*, as other suitable means may be adopted.

From the free end of arm *i* the cord is carried down to the knot-tying devices into a pair of griping jaws, V. As the binding-arm lifts, it carries the cord up and between the rotating jaws W, operated as will be hereinafter described, and as the grain is pressed in from the front of the binding-arm, forcing the straw back into the circle of arm *i*, leaving the cord around the bundle, one end being fast in the gripers W, the other end passing over the top of the arm *i* to the spool or ball of cord. The arm *i* passes down over the bundle with the cord on the under side of this arm, as seen in Fig. 24, until the point thereof extends through the knot-tying devices, stopping with the point even with the lower side of the gripers V, bringing the cord on the lower side of said arm also into the gripers W. These gripers, now having the cord lying across their jaws twice, close on the cord, and commence to rotate. The gripers W, rotating in the circle of the arm *i* at *x*, carry the two ends of the cord about once and a half around the end of the tube X, always stopping with the two ends of the cord across the slotted portion of the tube, so that both ends of said cord are across the center of said tube. The elongated gripers Y (open)
852 now enter the end of the tube X, and close on the cord lying across the center of said tube. The gripers now recede and pull the ends of the cord through the center of the tube X, and, finally, the cord (double) slips off the end of the tube, thereby producing what is known as a loop-knot. (Represented in Fig. 10.) To draw up this knot as it slips off the end of tube X onto a shield, $Y^1$, the gripers, still receding, tighten the knot over a horn, *z*. (Shown in Figs. 16 and 20.) After the knot is drawn tight the gripers open and release the bundle, so that it may fall to the ground. As the arm *i* descends through the knot-tying devices, the smallest concave *x'*, near the point of the arm, just passes over the gripers V, when the jaws or gripers W rotate and close, so as to grab the double cord, when gripers V open, and then shut on the cord drawn straight from the free end of arm *i* across the small concave *x'* on the under side of the binding-arm *i*, near its point, as above referred to. After this operation the rotating jaws complete their revolution, carrying the cord across a knife, $Y^2$, that is held fast on gripers V, which relieves the cord from arm *i*, the arm *i* still being threaded, the gripers V having caught the cord in the point of the arm, and rotating jaws W having caught the cord in the concavity *x'* on the under side of arm *i*, and cut it off above where the gripers V hold it, thus enabling the machine to repeat the operation of binding without losing hold on the cord.

A spur-wheel, *a'*, is inserted into one of the jaws of the gripers V, as represented in Figs. 16 and 27, so that as the cord passes into these gripers it will move this wheel one or two teeth at a time, thereby clearing the griping-faces of the jaws of any foreign material that may lodge therein. The cord also passing down on one

side of a tooth, and up on the other side of the same, the wheel aids in retaining the cord in place between the jaws.

The shield or divider K, represented in Figs. 1 and 13, is operated by means of a lug or cam. $b'$, on the periphery of the clutch 5.

Fingers 8 are operated by means of the weight of grain, which depresses them after the bundle is tied, allowing the bundle to pass off the said fingers and be discharged from the machine.

Helical spring B lifts the fingers, after the discharge of a bundle, into a proper position for receiving a sufficient quantity of grain to form another bundle. Said spring also lifts simultaneously the compressing-arms J into their proper places. Catch-lever $c^1$ hooks on a pin fastened into a segment, $c^2$, which holds the compressing-arms stationary and in a position to receive the grain for the next bundle.

The compressing-arms J are preferably constructed so as to be separate, or, if solid, they should be constructed concave laterally, so as not to bind the cord against the bundle of grain, which would, if the arms were solid, prevent the rotating jaws W from taking up the slack cord about the bundle while it is being compressed. The binding-arm $i$ is also preferably made of a skeleton form, for the reason above stated in reference to the compressing-arms J. If said arm $i$ is made solid, it must be constructed with a concavity to receive the cord.

Fig. 11 shows the compressing-arms J and their connection with spring-lever $J^1$. Lever $J^1$ is made of steel, and the longest arm of it is reduced in size, so that it will yield during the operation of the arms J in compressing a bundle. The connection of said arms with their spring-lever $J^1$ is made by a rod, $J^2$, which is adjustable endwise by means of a screw-section, $j$. My object here is to adjust the compressing-arms J for bundles of different sizes.

The link-and-lever movement H and L, which I have above denominated toggle-levers, is so adjusted that when the link $f$ is at its lowest stroke it brings said levers H and L down past a horizontal plane, so that these levers, descending below said plane and rising above the same, hold the free end of the arm $i$ down in the knot-tying devices a sufficient length of time to allow the bundle to be compressed and the knot to be finished.

During the operation of the arm $i$ it compresses the upper portion of the bundle, holding down the grain thereof while the lower arm, J, compresses the under side of the bundle.

It will be observed, by reference to the drawings, that the arms $i$ and J are segments of a circle, so that when the bundle is compressed by them it is cylindrical, and will remain tightly bound when detached from the tying devices.

I have represented in Fig. 1 two anti-friction rollers, $l$ $l$, which are applied to a bracket secured to the inner reel-post, M, the object of which is to diminish the friction on the reel-shaft N, and thereby enable me to use a single reel-chain, $p$, of common construction, to perform the work, not only of reeling in the grain, but also the work of compressing and tying the bundles of grain. More than one reel-chain may be used, if desired.

I do not claim, broadly, anti-friction rollers for supporting a shaft in a harvesting-machine, as this is old and well known. I locate my rollers *l l* on the inner reel-post, and arrange them in such manner that during the operation of reeling in the standing grain they will prevent undue friction on the reel-shaft.

On sheet 7 I have represented a method for connecting the knot-tying devices with the cam-wheel *u*. The letter *w'* designates a connecting-rod working the gripers Y. As these gripers reciprocate endwise they carry an anti-friction roller, *u'*, (which is at the extremity of one of the arms of the gripers,) on the lower side of a guide, $v^1$, on their back stroke. The forward stroke of these gripers brings the roller *u'* on the upper side of the guide $v^1$, opening the jaws of the gripers to receive the cord in their passage into
853 the tube X. These gripers pass into the tube X just far enough to grab the cord, and when the cord is seized the gripers continue the forward stroke until the lug $L^3$ strikes the shoulder 9, (shown clearly in Figs. 17, 20, and 21,) moving the jaw W until it hooks on a catch, *q*. When the roller *u'* gets past the guide $v^1$ spring *w* exerts its force on the gripers Y to seize the cord, as the gripers Y retreat to finish the knot. But in the back stroke of the gripers Y they retreat just far enough to pull up the knot tightly, at which time the roller *u'* again comes in contact with an inclined guide, $x^4$, that opens the jaws of the gripers and releases the cord. Guide $v^1$ is constructed with a pivoted section, the beveled end of which is free to vibrate, for the purpose of allowing roller *u'* to pass on its upper side as the gripers commence their forward stroke.

The light spring designated by the letter $y^1$ is intended to keep the pivoted section of the guide down in its place. One end of rod *w'* is pivoted, in a suitable manner, to the gripers Y. The other end of this rod *w'* is pivoted to the upper arm of a lever, 12, shown in Figs. 29 and 30. The lower end of lever 12 is pivoted to the frame of the machine. At or near the center of lever 12 is an anti-friction roller, *z'*, which is acted on by a cam-groove of wheel *u*, so as to give the upper end of said lever 12 a vibratory motion that is transmitted to the gripers Y.

On the opposite face of cam-wheel *u*, and actuated by the cam-wheel, is a lever, 13. This lever is pivoted at $v^2$, and its free end is pivoted to a connecting-rod, $y^2$, that gives a vertical reciprocating motion to a rack, 14, through the medium of an arm, $x^2$, which rack gives motion to the pinion 15 on the cylinder which carries the rotating jaws W.

As the gripers Y recede, rack 14 reaches its upward stroke, which turns pinion 15 about once and a half around, thereby bringing the gripers W into position to receive the cord from the arm *i* preparatory to binding another sheaf. Gripers Y then start forward, engaging lug $L^4$, with the tang $L^2$ opening the rotating jaws W, and holding them open until the cord has been passed twice between them by the binding-arm *i*, at which time they begin to rotate, thereby releasing tang $L^2$ from stud $L^4$, and allowing the spring S' to close the rotating jaws W.

As the jaws W commence to rotate, the cord is brought across the stationary knife $Y^2$, which severs the cord held by jaws W from the cord held by gripers V.

It will be observed, from the above description, that the gripers V seize and hold the cord previous to the operation of the arm *i* in delivering the cord to the tying devices, and when gripers W commence to rotate with the double cord around the tube X, and just before they reach the stationary knife $Y^2$, a stud or roller on the side of rack comes in collision with the movable jaw on the gripers V, opening those gripers just enough to catch the cord before the jaws W reach the stationary knife that severs the string from the gripers V.

Other devices may be employed for opening the gripers V; but I now preferably employ the device above described.

What I claim, and desire to secure by letters patent, is—

1. Rotating jaws or cord-holders W, combined with a stationary transversely-slotted tube X, and the rectilinear reciprocating gripers Y, substantially as described.

2. Rotating jaws or cord-holders W, combined with a slotted tube, X, rectilinear reciprocating gripers Y, and horn *z*, substantially as described.

3. A knife, $Y^2$, combined with rotating jaws W and cord-holding gripers V.

4. The spurred wheel *a'*, combined with the cord-holding jaws V, and so constructed that it will assist in holding the cord without cutting the same, and at the same time clearing the jaws, substantially as described.

5. A shield, $Y^1$, of tubular form, rigidly secured to one of the jaws of the gripers Y, substantially as described.

6. Gripers Y, a tubular shield, $Y^1$, on one of the jaws on said gripers, a horn, *z*, and rotating gripers W combined, whereby the knot is tightened, substantially as described.

7. A curved vibrating, compressing, and cord-carrying arm, *i*, of curved form, recessed at *x* $x^1$, and combined with cord-griping jaws W and gripers Y, substantially as described.

8. A vibrating divider, K, in combination with a vibrating cord-carrying arm, *i*, for the purpose described.

9. In combination with a vibrating divider, K, a hood, K', arranged over it, for the purpose set forth.

10. In combination with one or more rigid compressing-arms J and flexible supporting-fingers S on shaft U, the cord-carrying arm *i*, substantially as described.

11. A spring-lever, $J^1$, combined with the compressing arms J, for the purpose set forth.

12. In combination with the compressing-arms J and a lever, $J^1$, an endwise-adjustable connecting-rod, $J^2$, for the purpose described.

13. Latch 3, starting-bar A, catch 4, tube *c*, bar *m*, in combination with a clutching device on the shaft G, for the purpose described.

14. The rigid compressing-arms J and shaft U, in combination

with the light flexible fingers S and spring B, substantially as described, and for the purpose set forth.

15. In combination with a lifting device for measuring the grain, a tripping-arm, O, and intermittently-rotating fingers P, substantially as described.

16. Intermittently-rotating dividing-arms P, in combination with a divider, K, and a cord-carrying arm, *i*, substantially as described.

17. Intermittently-rotating dividing-arms P, in combination with a hood, K′, and a vibrating divider, K, substantially as described.

854 18. The combination, with the toggle-levers H and L and link *f*, of the compressing and cord-carrying arm, *i*, substantially in the manner and for the purpose described.

19. An adjustable grain-guide, T, combined with a grain-elevator in a harvester, substantially as described.

20. In combination with a catch, *q*, the rotating jaw W, for the purpose described.

21. In combination with the switch $e^1$, the gripers Y, provided with the anti-friction rollers $u'$, for operating the jaws of the gripers, substantially as described.

In testimony that I claim the above I have hereunto subscribed my name in the presence of two witnesses.

GEORGE F. GREEN.

Witnesses:
JOHN F. ACKER.
C. H. McEWEN.

2 Sheets—Sheet 2.

J. F. STEWARD.

GRAIN-BINDER.

No. 191,264. Patented May 29, 1877.

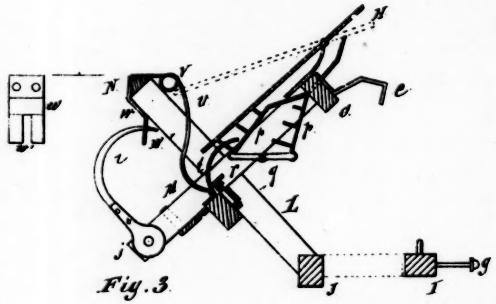


Fig. 3.

Fig. 4.

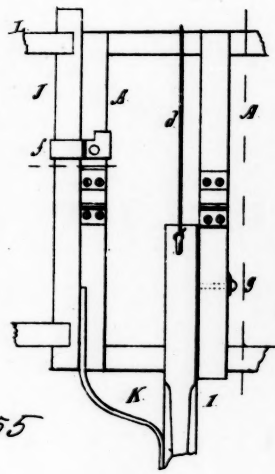


Fig. 5.

Fig. 6.

No. 322.
Deering
v.
M. H. W. et al
h. 855

Witnesses:
Frank Sull
L. B. Wood

Inventor:
John F. Steward

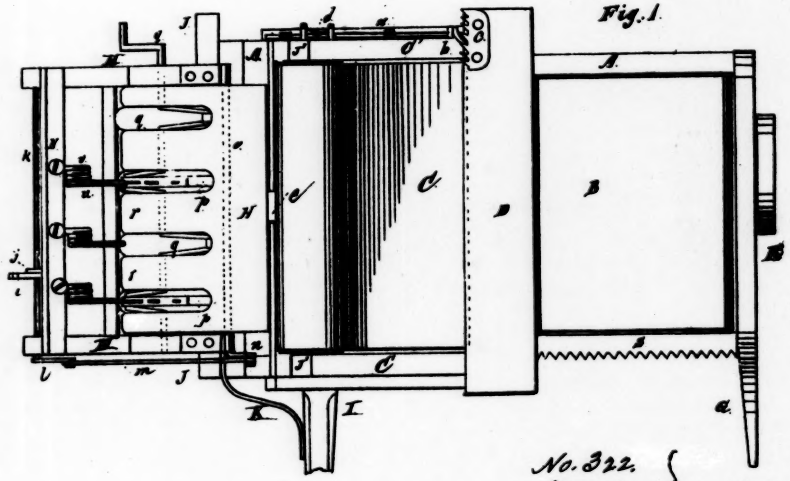
2 Sheets—Sheet 1.

J. F. STEWARD.

GRAIN-BINDER.

No. 191,264. Patented May 29, 1877.

Fig. 1.



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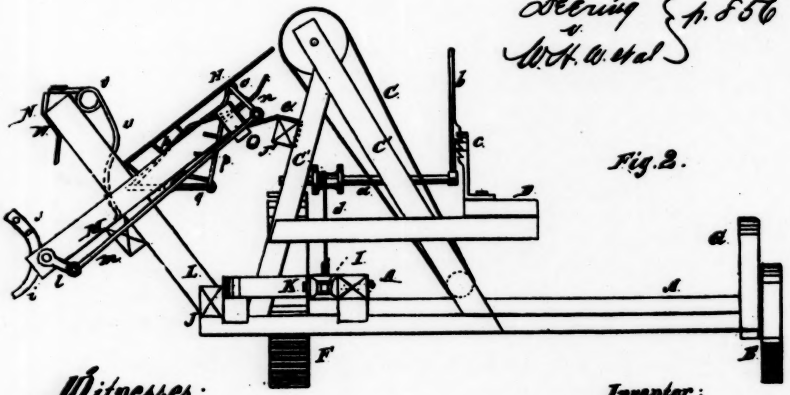
p. 856

Fig. 2.



Witnesses:
Frank Hill
L. B. Wood

Inventor:
John F. Steward

857 UNITED STATES PATENT OFFICE.

JOHN F. STEWARD, of Plano, assignor to ELIJAH H. GAMMON and WILLIAM DEERING, of Chicago, Illinois.

*Improvement in Grain-binders.*

Specification forming part of Letters Patent No. 191,264, dated May 29, 1877; application filed October 24, 1876.

To all whom it may concern:

Be it known that I, John F. Steward, of Plano, Kendall county, State of Illinois, have invented new and useful improvements in harvesters, of which the following is a full description, reference being had to the accompanying drawings, in which—

(Here follow diagrams marked pp. 855 & 856.)

Figure 1 is a top or plan view; Fig. 2, a front elevation; Fig. 3, a cross-section of the receiver and its appliances; Fig. 4, a plan view of so much of the frame-work as is operated in shifting the grain-delivery; Fig. 5, a cross-section of the frame-work, showing the attachment of the tongue; Fig. 6, a detail of the catch or loop for holding the receiver in position.

The object of this invention is to improve the construction of grain harvesting and binding machines; and its nature consists in so constructing and attaching the cutting and delivering mechanism that they may be adjusted so as to deliver the grain to the wire which is to form the band in either a fore or aft position, as the length of the straw may require; in providing an easy adjustment of the cutting and delivering devices to the receptacle; in furnishing a more perfect and effectual device for bringing the grain within reach of the binding-arm; in providing a device for compacting the grain ready for binding; in providing a device for checking the flow of grain from the delivery-apron to the binding mechanism; in providing devices for retaining the cut grain in proper position at all times while being forced into the binding-wire, and in the several parts and combination of parts hereinafter set forth and claimed as new.

In the drawings, A represents the main frame; A′, the draft-sill; B, the carrier; C, the elevator; C′, the elevator-frame; D, the driver's platform; E, the grain-wheel; F, the main or driving wheel; G, the divider; H, the receiving-platform; I, the tongue; J, the movable cross-bar to which the receiver is attached at its lower end; J′, the cross-bar of the elevator-frame to which the receiver-frame is connected; K, the connecting bar or brace; L M, the cross-bars constituting the ends of the frame-work of the receivers; N, the cross-bar to which the retaining springs or rods are attached; O, the upper cross-bar of the receiver; *a b*, the shaft and lever for shifting the delivery; *c*, the curved bar or rack for holding the lever *b* in position; *d*, the cord or chain connecting with the rear end of the tongue;

*e*, the hook upon the receiver through which the bar J′ slides; *f*, the hook or catch sliding upon the bar J of the receiver-frame; *g*, the pin connected with the tongue and passing through a slot, as shown at Fig. 5; *h*, the slot; *i*, the binding-arm; *j*, the projection to which the binding-arm is attached; *k l*, the crank-shaft to which the binding-arm is attached; *m*, the rod for connecting the tilting platform to the needle-shaft *k*; *n o*, the crank-shaft for operating the platform H; *p*, the sliding bars provided with teeth which project through openings in the platform H; *q*, the crank-bar for operating the slides *p*; *r*, the twisting-hook; *s*, the sickle; *w* is a piece of metal secured to the upper part of the binder-frame, as shown. It is provided at its lower portion with a slot, *w*′, and is so located that the needle, in its forward and return movement, will pass through this slot, which is a little wider than the width of the needle, but fitting sufficiently close to scrape or force off any straws or extraneous matter that may be caught by the needle or wire or between the two. The frame-work A C′ is made in the usual manner, and is provided with a suitable carrier, B, and the elevator C, and is also provided with a reel and gear for operating the sickle in the usual manner, which are not shown.

The main wheel F, grain-wheel E, and divider G are also made in any of the suitable or well-known forms.

The receiver or binder frame is most conveniently made of the X form, and the receiver and cutting and delivering parts are secured in place to each other by the hooks *e* and *f* and bars J and J′, as shown in Fig. 2.

The tongue is attached to the bar J of the binder-frame by the bent bar or brace K, and is guided on the main frame by the pin or bolt *g*, which passes through the slot *h* in the inner cross-bar of the main frame, on which the inner end of the axle of the main
858 wheel is supported by suitable bearings. (Shown in Fig. 4.)

The rear end of the tongue is attached to the shaft *a* by means of the cord or chain *d*, which may run directly onto the shaft, or onto a spool connected with the shaft, as shown in Fig. 2. As shown, the bar K is rigidly attached to the bar J; but it may be pivoted thereto, if desired.

The receiving-platform H is firmly attached to the shaft or journal-bar *o*. It is provided with slots, through which the teeth on the bars *p* protrude when elevated.

The shaft *o* is provided with a crank, *n*, which is connected by the rod *m* with the crank-shaft *k l*, so that when the binding-arm *i* is brought down to the twister, the same movement will elevate the platform H above the teeth on the arms *p*, as shown by the dotted lines in Fig. 3.

When the binding-arm is raised the platform H returns to position, when the accumulated grain passes down against the spring-arms *u*, and is crowded through in a compact gavel by the teeth on the slides *p*.

By using independent springs, they yield according to the pressure, so that the grain is delivered to the binder in a more compact and even form than it would be by the use of a rock-shaft provided

with arms or teeth to hold the grain back while the bundle is being tied.

The binding-arm *i* and the twister *r* are made of any of the approved forms.

The shaft *q* is bent so as to form cranks, moving in opposite directions, whereby a portion of the arms *p* are elevated and a portion depressed by the same movement.

The rear ends of these arms *p* pass through slots or openings in the cross-bar O of the binder-frame, in which they slide freely, thereby doing away with the necessity of supporting or operating the rear ends by an additional shaft-crank, similar to the shaft *q*.

The shaft *q* and the shaft *k l* are operated by any suitable gearing and connections. (Not shown.)

In operation, the tongue is locked in position by the leaver *b* and rack *c*. When it is desired to deliver the grain farther back upon the receiver H, the lever *b* is released from the rack, when the cutting and delivering parts are allowed to fall backward until the rope or chain *d* becomes taut, when they move forward, as before. When it is desired to receive the grain farther forward, the lever *b* is pressed backward by the driver, which again shifts the relative position of the receiver and elevator.

The grain, as it falls upon the platform H, is carried along by the inclined position of the receiver, and by the teeth on the arms *p*, which crowd it against the spring-arms *u v*. The shield *t* prevents these teeth from crowding the grain down onto the twisting-hook, and also prevents short grass or grain leaves from going in to interfere with the twisting devices. The teeth on the bar *p* crowd the grain against the spring-arms and compact the bundle, so that it is delivered to the binder in a compact form, so as to dispense with the use of a compressor.

When delivered to the tying-arm *i* the grain is bound with wire or cord, and twisted or tied in any suitable manner, by the use of any well-known device for twisting wire or tying cord, which is located beneath the shield *t*.

The carrier and elevator operate in the usual manner.

The ordinary reel, cover for the elevator, and gearing for driving the cutting, elevating, and binding apparatus are to be applied; but their operation, being well known, need not be described.

What I claim as new, and desire to secure by letters patent, is as follows:

1. The sliding tongue I, in combination with and attached to a binder-frame, carrying a binding mechanism, for adjusting such mechanism to the length of the cut grain, substantially as specified.

2. The carrier B and elevator C, having a fixed position in relation to the main frame, in combination with the adjustable tongue, having a fixed position in relation to the binding mechanism, for regulating the delivery of the grain for binding, substantially as described.

3. The combination of the sliding tongue I, bent bar K, and bar J, supporting the receiver, with the pin *g*, slot *h*, chain *d*, shaft *a*, lever *b*, and rack *c*, substantially as specified.

4. The combination of the sliding arms *p* and crank-shaft *q* with the tilting receiving-platform H, having openings for the teeth of the arms *p*, all constructed and operated substantially as described.

5. The combination of the toothed arms *p*, slotted receiving-platform H, and the fixed spring-arms *u v*, for compacting the gavels, substantially as specified.

6. The separate plate W, having slot W′, attached to the frame, in combination with the needle-arm, whereby the needle-arm is cleared from straws on its upward movement, substantially as described.

JOHN F. STEWARD.

Witnesses:
FRANK LULL.
L. B. WOOD.

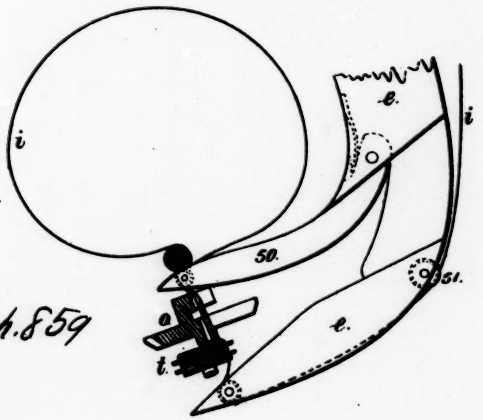
3 Sheets—Sheet 3.

E. CHAPMAN.

GRAIN-BINDER

No. 192,150. Patented June 19, 1877.

Fig. 3.




No. 322.
Deering
v.
W. H. W. Chal
p. 859

Fig. 5.

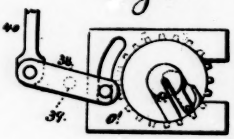



Fig. 6.

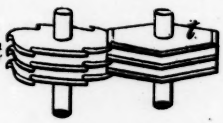



Fig. 4.

Witnesses
Chas. H. Smith
Harold Serrell.

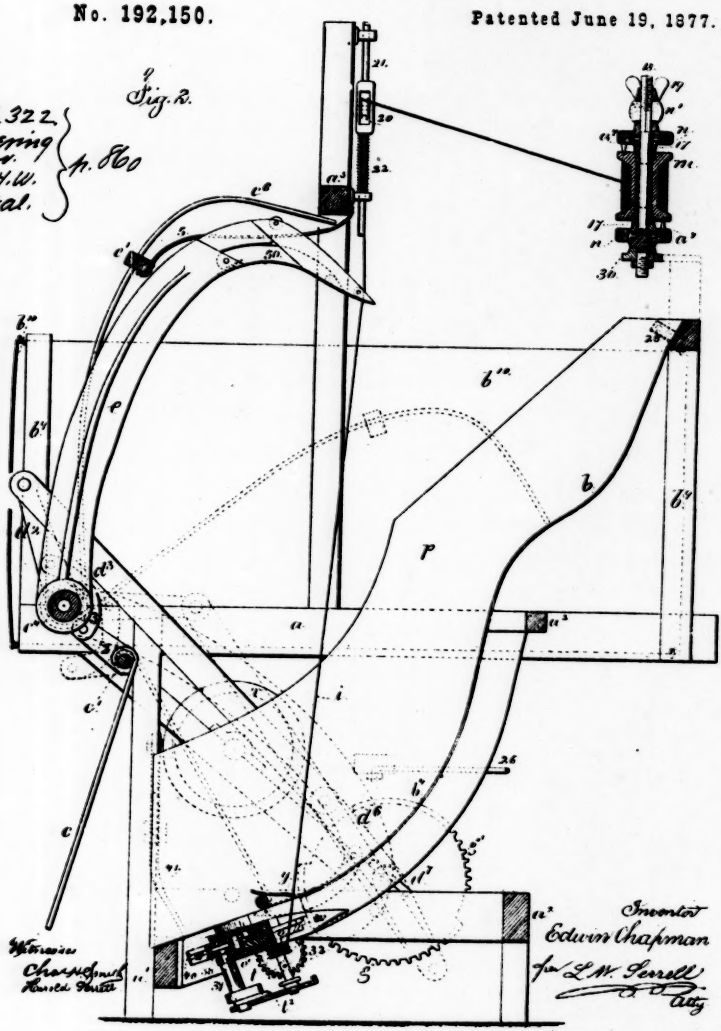
Inventor
Edwin Chapman
for L. W. Serrell
Atty

3 Sheets—Sheet 2.

E. CHAPMAN.

GRAIN-BINDER.

No. 192,150. Patented June 19, 1877.



3 Sheets—Sheet 1.

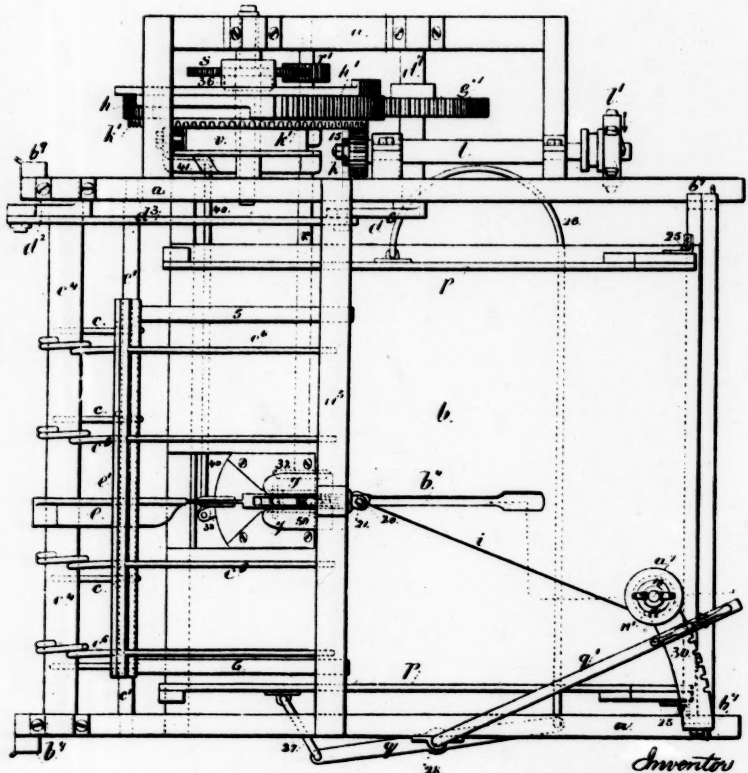
# E. CHAPMAN.

## GRAIN-BINDER.

No. 192,150. Patented June 19, 1877.

No. 322, Deering v. W. H. W. et al

Fig. 1.



Witnesses
Chas. H. Smith
Harold Sewell

Inventor
Edwin Chapman
per L. N. Sewell
atty

862 UNITED STATES PATENT OFFICE.

EDWIN CHAPMAN, of Rochester, Minnesota, assignor to Chapman Binder Company, of same place.

*Improvement in Grain-binders.*

Specification forming part of Letters Patent No. 192,150, dated June 19, 1877; application filed February 16, 1876.

To all whom it may concern:

Be it known that I, Edwin Chapman, of Rochester, in the State of Minnesota, have invented an improvement in binder attachments for harvesters, &c., of which the following is a specification.

My invention is adapted to the reception of the loose grain from any harvesting-machine where the grain is sufficiently elevated to be delivered into the machine; or this binder may be employed for binding grain under any circumstances wherever available.

The binder attachment which I have represented in the drawings is of a character especially adapted to the harvester known as the "Elward harvester."

In my machine the grain is received from any ordinary elevating apparatus upon an inclined curved platform, and passes down the same, and is arrested by the binding-wire and compressor-fingers. An arm descends, carrying the wire with it around the bundle, the wire is caught, the bundle compressed, the wire twisted and cut, and then the bundle discharged and the compressing-arm rises, leaving the end of the wire held by a rotary jaw. During these movements the grain that is supplied to the machine is held up out of the way by wire fingers, that are lifted as the arm rises, and the grain descends, and the next bundle is formed.

The special features of improvement relate to a means for preventing the wire from being broken by the sudden pull before the reel can commence to turn; to the construction of the compressing and wire-carrying arm; to the means for holding and cutting the wire; to the fingers for holding up the grain combined with the platform and arm; and to the combination of the various devices and mechanisms for performing the respective operations.

(Here follow diagrams marked 859, 860, & 861.)

In the drawing, figure 1 is a plan of the binder. Fig. 2 is a vertical section of the same at the line *x x*. Fig. 3 is a diagram in larger size, illustrative of the means for holding the wire and twisting the same. Fig. 4 is a detached plan of the rotary holding and cutting jaws, and Fig. 5 is a plan of the twisting-jaws.

The frame of the machine is made of the timbers *a a*, that are especially adapted to be connected to the harvester, and the vertical posts $a^1$ and transverse timbers $a^2$ are framed together, and adapted to receive the other parts of the machine.

The grain receiver or platform $b$ is inclined and curved, substantially as shown in Fig. 2. It has a narrow vertical slot, $b^4$, for the end of the arm carrying the binding-wire to pass through, as hereafter described, and this slot is narrow, so that grain cannot enter thereinto.

The grain is delivered upon the upper part of this grain-receiving platform by any suitable elevating-apron, or otherwise, and it falls down the same, and is arrested by the compressor-fingers $c$ and binding-wire $i$, that occupies nearly a vertical position while the grain is being received.

The fingers $c$ are upon the cross-shaft $c^1$, that has a crank-arm, 2, and link 3 to the crank $d^1$ upon the cross rock-shaft $c^4$, having upon it the wire carrier arm $e$, also the spring-volutes of the wire-fingers $c^6$.

These wire-fingers $c^6$ are connected by a cross-bar, $e'$, with suspending-straps 5, to the cross-head bar $a^5$.

The crank-arm $d^2$ has a connecting-rod, $d^5$, to the crank $d^6$, that is revolved periodically, a half-revolution being given, then a pause, then the next half-revolution more rapidly, and then another pause, and so on. To effect these movements, differential stop-motion gear-wheels are used similiar to those in my patent No. 123,237, the gear-wheel upon the shaft $d^7$ of the crank $d^6$ having a larger segment, $g$, of teeth, and a smaller segment, $g'$, of teeth, with intermediate blank spaces, and the teeth of $g$ are driven by the segment $h$ upon the larger wheel, and the teeth of $g'$ by the segment $h'$. There are intermediate portions of the wheel $h$ $h'$, that are plain, so that the pauses in the movement of the crank $d^6$ occur at the times when the plain portions are passing the spaces between the teeth-segments $g$ $g'$.

I remark that the power to drive the wheel $h$ $h'$ may be derived from any suitable source. I have shown for this purpose the
863 bevel-wheel $k'$ and pinion $k$. The pinion $k$ is upon the end of the shaft $l$, and it is confined in place by a collar and nut, 15, and turns by the frictional contact, the object being to allow the pinion to slip if there is any obstruction to the movement of the other parts, so as to prevent injury.

Up this shaft $l$ is the chain-wheel $l'$, from which a chain passes to the bull-wheel of the harvester, and this wheel $l'$ may be fitted as a clutch-wheel and moved endwise upon a shaft, so that the mechanism is set in motion at the proper intervals to suit the supply of grain to form a sheaf or bundle. The wire is upon the reel or spool $m$, (shown sectionally in Fig. 2,) and this spool is centered by the cones 17 upon the vertical stud 18. These cones are provided with disks $a^7$, having grooves in their surfaces in contact with friction-plates $n$, and a spring, $n'$, and nut 19 serve to regulate the friction applied to the spool. The annular grooves in the friction-plates retain the lubricating material, and render the friction more uniform than that derived from flat or conical disks.

The wire from the spool $m$ passes over the grooved wheel 20 upon the vertically-sliding bar 21, that has a spring, 22, which yields to

a sudden pull upon the wire, and prevents the wire from being broken before the inertia of the spool or reel can be overcome.

The wire *i* passes through the end of the arm *e*, and down to the holding device, hereinafter described. The end of the arm *e* is made of two thin steel plates, terminating in a point, so as to require but a narrow slot in the grain-receiving platform, and there is a small grooved roller in the point to lessen friction upon the wire.

The operation of the parts thus far described is as follows: As the grain slides down the platform or receiver it stops against the wire *i*, and when the binding mechanism moves, the fingers *c* move up against the lower side of the grain as the binding-arm *e* descends, and the grain is pressed between them. At the same time the movement of the arm carries the wire around the bundle into the position shown in the diagram, Fig. 3, ready to be twisted by the means hereinafter described.

As the movement of the rock-shaft $c^4$ brings the arm *e* down, it lowers the fingers $c^6$, and their ends rest upon the platform *b*, or else they are suspended by the straps 5 from the head-beam $a^5$, and the ends of these fingers arrest the further passage of the grain down the platform until the reverse movement raises the arm *e* again, and by the cross-bar *e'* lifts these wire fingers out of the way.

These fingers are each preferably twisted to form a spring-eye around the rock-shaft $c^4$, and the end inserted into such rock-shaft. Hence the fingers form springs that aid in sustaining the weight of the arm *e* as it is moved down below them and then raised again; but such fingers may be loose at the rock-shaft, and not made as springs, if so desired.

In order to guide the grain as it falls down the inclined receiver, and place the grain in position for the wire band to come at the right place, I make use of the guide-boards *p p*, that are hinged at 25, and connected by the links 26 and 27 to the lever *q*, that is upon a vertical shaft, 28, and provided with a lever, *q'*, at the upper end, having a latch to take holes or teeth in the segment 30. By moving this lever *q'* the guide-boards *p* will be brought nearer together or moved farther apart, as the length of the straw may require.

Beneath the platform, at the place where the wire is twisted, there is a revolving wheel and holding-jaw, *o*, substantially similar to that set forth in my patent No. 126,520, and the clamp-operating slide *o'* is also similar.

The revolving wheel and jaw *o* are moved at the proper time by a bevel-wheel, 32, on the shaft *r*, that is provided with a pinion *r'*, driven by a wheel, *s*, that receives its motion from the pinion 36, that is operated upon by a segment of teeth upon the wheel *h*, and turned once by that segment, and then held during the remainder of the revolution of the wheel *h*. This produces several turns of the twisting-wheel *o*, and in order to operate the clamp *o'* of the wire-twisting jaw, I use the crank-arm 38, that acts in a slot in said clamp *o'*, and this crank-arm is upon a short vertical shaft, 39, that is rocked by a link, 40, to the lever 41, that receives its motion from the cam *v* upon the wheel *h h'*.

Beneath the revolving twisting-wheel *o* are the revolving jaws

and knives $t$ $t$, that are geared together at their lower ends and moved around progressively by a pawl, $t^2$, and arm on the shaft 39. (See Fig. 4.) These jaws are made as polygonal plates, those on one of the vertical studs coming opposite the spaces between the plates on the other, and the upper pair of these plates act as cutters and the lower ones as holding-jaws.

There are hooked angles to the polygonal plates of one of the jaws, as shown more clearly in Fig. 6, so as to catch the wire and carry it into the jaws.

The parts are so timed that after the wire $i$ has been brought down by the arm $e$ into the twisting-wheel $o$ and laid between the two jaws $t$, as illustrated in Fig. 3, the link 40 is moved to clamp the wires in the revolving wheel, and the jaws $t$ are simultaneously turned to seize the wire between the polygonal edges, and the upper pair of plates cut off such wire, leaving the twisting-wheel to act in twisting the wire together as such wheel is revolved.

Upon the bed contiguous to the revolving twisting-wheel is a slotted tongue or fork, $w$, and in the wire-carrier there is a hinged tongue, 50, that has a roller near the end. This is kept within the plates at the end of the arm $e$ by a spring, so as to pass freely through the grain with the wire, but this tongue 50 runs over the fork $w$ as the wire-carrier completes its downward movement and forces the wire home into the revolving twisting-wheel.

864 A roller at 51 lessens friction upon the wire, and at $y$ there are springs projecting from the surface of the platform, which springs are drawn down in twisting the wire, but when the wire is liberated from the twister by drawing back the clamping-plate $o'$ these springs draw the wire out from the twisting-wheel, and cause the delivery of the bundle.

There are vertical posts 69 at the angles of the machine, and around these there is a canvas curtain tightly secured, as at $b^{10}$, (see Fig. 2,) so as to keep wind from blowing the grain away from its position in the binder.

I do not claim an arm passing through the slotted platform and carrying the wire. In machines that have been made the slot is necessarily wide, and the grain falls through and becomes clogged in the mechanism.

I claim as my invention—

1. The wire-carrier arm $e$, made with a metal plate at the end thereof passing edgewise through the narrow slot $b^4$ of the grain-receiving platform $b$, in combination with the hinged tongue 50, fork $w$, twisting-wheel $o$, rock-shaft $e^4$, and actuating mechanism, substantially as set forth.

2. The combination, with the wire-carrier arm and its rock-shaft, of the stop-motion wheel $y$ $y'$, crank $d^6$, connecting-rod $d^3$, and arm $d^2$ upon the rock-shaft $e^4$, substantially as specified.

3. The fingers $e^6$ upon the rock-shaft $e^4$, and connected by the cross-bar $e^1$, in combination with the wire-carrier arm $e$, substantially as set forth.

4. The friction-plates $n$, with grooves in their surfaces, and the

cones 17 for centering the spool or reel of wire, in combination with the spring and frictional adjusting-screw 18, as specified.

5. The sliding rod 21, sheave 20, and spring 22, in combination with the wire-holding spool *m* and wire-carrying arm *e*, for the purposes and as set forth.

6. The frictional pinion *k* upon the driving-shaft *l* and the chain-wheel *l'*, in combination with the stop-motion wheels and binding mechanism, substantially as set forth.

7. The combination, with the grain-receiver *b*, of the hinged side boards *p* and adjusting mechanism, substantially as and for the purposes set forth.

8. The combination, with the twisting mechanism, of the springs *y* upon the surface of the platform, for the purposes set forth.

9. The polygonal holding and cutting jaws *t*, constructed of steel plates, and operating substantially as set forth.

10. The combination, with the polygonal holding and cutting jaws *t*, of the revolving twisting-wheel *o* and its clamp *o'*, substantially as set forth.

11. The rock-shaft 39 and its actuating mechanism, in combination with the revolving holding-jaws *t*, the twisting-wheel, and the clamping-plate *o*, substantially as specified.

12. The combination, with the grain-binding mechanism, of the inclined platform or receiver and a canvas or equivalent inclosure, $b^{10}$, for protecting the grain from wind, as set forth.

Signed by me this 20th day of January, A. D. 1876.

EDWIN CHAPMAN.

Witnesses:

C. H. BLISS.

T. H. McCONNELL.

867 UNITED STATES PATENT OFFICE.

CHARLES W. MARSH and WILLIAM W. MARSH, of Sycamore, Illinois.

*Improvement in Harvesters.*

Specification forming part of Letters Patent No. 41080, dated January 5, 1864; Reissue No. 6223, dated January 12, 1875; application filed December 10, 1874.

Division A.

To all whom it may concern:

Be it known that we, Charles W. Marsh and William W. Marsh, formerly of Shabbona, in the county of De Kalb and State of Illinois, now of Sycamore, in said county and State, have invented a new and improved raking device for harvesters; and we do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, consisting of two sheets, making a part of this specification, in which—

(Here follow diagrams marked pp. 865 & 866.)

Figure 1 is a top or plan view, and Fig. 2 a front elevation.

To enable others skilled in the art to make and use our machine, we will proceed to describe it.

A represents a horizontal rectangular frame, in which a horizontal band, B, is placed and fitted over rollers *a a*. This band or carrier B extends over the whole width of the space in frame A, as shown, and moves in the direction indicated by the arrow 1. C represents the sickle, which may be of the ordinary reciprocating kind, and works at the front of the frame A. This sickle is provided with a series of upright ribs or projections, *b*, attached to its back part, the upper edges of which (said ribs or projections) are inclined, so as to leave a vertical face, *c*, at one end, while the upper edges are inclined downward and backward, as shown at Fig. 2. D represents an endless toothed apron, or what may be termed an endless band of rakes. This toothed apron D has an inclined position, and works over rollers *d d'*, one of which, *d*, has its bearings in the frame A, and the other, *d'*, in an upright frame, E, which is attached to the frame A. The toothed apron D moves in the direction indicated by the arrow 2, and the aprons or carriers D B are moved by power applied to the upper roller, *d'*, of the apron D, motion being communicated from the roller *d'* to one of the rollers *a* by a suitable belt, *e*. The pulleys *f f'*, over which the belt *e* passes, are of different diameters, the pulley *f* of the roller *d'* being of a larger diameter than the pulley *f'* of the roller *a*; hence it will be seen that the band B will move faster than the toothed apron D. F is a belt, which passes around pulleys *g g'* at the ends of the rollers *d' d*, and they are extensions of said rollers. This belt is provided with teeth *h* at suitable distances apart. This belt F forms a part of the elevator, and projects forward in line, or nearly in line, with the front edge of the sickle C.

No. 3220
Deering
v.
W. H. W. et al.
p. 865

2 Sheets--Sheet 1.

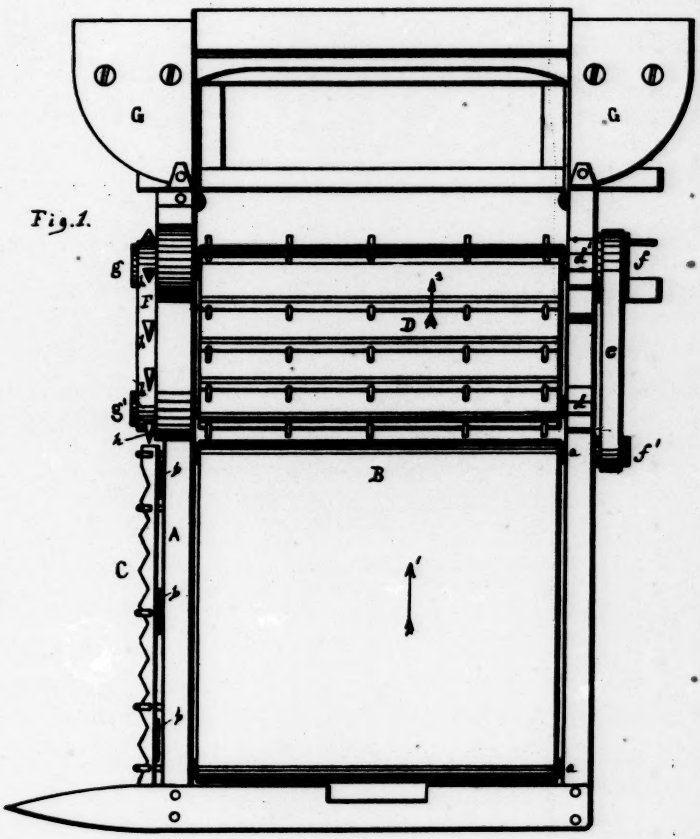
C. W. & W. W. MARSH.

Harvesters.

No. 6,223.

Reissued Jan. 12, 1875.

Fig. 1.




WITNESSES:

Daniel F. Lask

E. A. West

INVENTORS:

Charles W. Marsh

William W. Marsh

2 Sheets--Sheet 2.

C. W. & W. W. MARSH.

Harvesters.

No. 6,223. Reissued Jan. 12, 1875.

No. 322.
Deering
v
W. H. W. et al.
p. 866

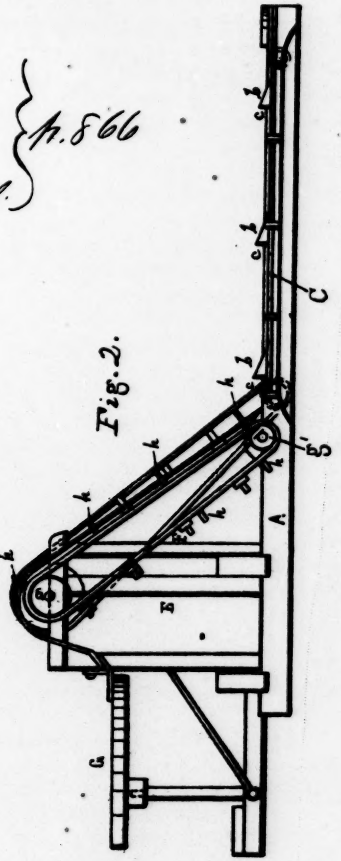



Fig. 2.

WITNESSES:

Daniel F. Fast
E. A. West

INVENTORS:

Charles W. Marsh
William W. Marsh

In operation, as the harvester is drawn along, the grain cut by the sickle C falls upon the band or carrier B. This band, by its movement, conveys the grain to the toothed apron D, the butts of the grain being at the front edge of this band or carrier B. The grain, owing to the movement of the belt, does not fall on the carrier at right angles with the sickle C or band B, but will fall more or less obliquely, according to the position in which it may stand when cut, and the rapidity with which the carrier B moves, the heads of the grain being in advance. The grain or straw is brought at, or nearly at, right angles with the band B by two different means, one being the ribs or projections *b* on the back of the sickle C, which, as the sickle moves back, pass under the butts of the straw, and on the return movement catch in the butts and move them forward toward the elevator D F, which movement is repeated at each stroke of the sickle. The other means of straightening the grain, or bringing the straw parallel, consists in the difference of speed between the band or carrier B and the toothed apron D. In consequence of the former having a faster movement than the latter the grain will be straightened and brought at, or nearly at, right angles with the lower edge of the toothed apron, so that the grain will ascend, or be carried up by the elevators F D, and delivered upon the receiver in the position required for binding. The movement of the grain in the inclined position in which it falls and the straightening of it against the elevators tend to advance the butts forward on the machine, which increases the difficulty of elevating it. To overcome this difficulty, we make the elevator wider than the band or carrier B, by means of an additional belt or section, F, so that, while the grain is being carried up, the toothed belt
868 or part F of the elevator holds the butts of the stalks, and prevents them from lagging or falling over. Thus it will be seen that the grain will be discharged from the upper end of the elevator D F with the straw all parallel, or nearly so, with it, and the grain, consequently, can be taken from the box or receptacle, into which it is discharged in an even state, so that it may be bound with facility.

G G represent the binders' table or tables, secured to the frame A. The receptacle into which the grain is discharged (not represented) may be just below the upper elevation or end of the toothed apron D.

What we claim as new is as follows:

1. The combination of the sickle C, provided with the ribs or projections *b*, with the endless band B and toothed apron D, substantially as and for the purpose specified.

2. The toothed belt F, in combination with the toothed apron D and endless band B, as and for the purpose specified.

3. A grain-elevating mechanism having its front part arranged to operate on or near to the cutting line, substantially as and for the purpose specified.

CHARLES W. MARSH.
WILLIAM W. MARSH.

Witnesses:
GEO. S. ROBINSON.
M. M. KETCHAM.

873 UNITED STATES PATENT OFFICE.

JAMES HOWARD and EDWARD T. BOUSFIELD, of Bedford, England.

## *Grain-binding Machine.*

Specification forming part of Letters Patent No. 274,772, dated March 27, 1883. Application filed December 12, 1881. (No model.) Patented in England September 22, 1881, No. 4092.

To all whom it may concern:

Be it known that we, James Howard, agricultural engineer, and Edward Tenney Bousfield, engineer, both of Bedford, England, have jointly invented new and useful improvements in grain-binding machines, (for which we have obtained provisional protection in Great Britain, No. 4092, bearing date September 22, 1881,) of which the following is a specification:

The main object of our present invention is to improve the construction and increase the efficiency of sheaf-binding harvesting-machines of the type or class commonly known as the "Marsh harvester," and more especially the machines of this class as modified by the application thereto of the devices described in the specification of a patent granted to John F. Abbleby, dated February 18, A. D. 1879, No. 212,420.

The said invention is illustrated in the accompanying drawings, in which figure 1 is a side elevation, and Fig. 2 a front elevation, of one of these machines with our improvements applied to the same. Figs. 3 and 4 illustrate, by a plan and vertical section, portions of our said improvements. Figs. 5 and 6 illustrate, by a longitudinal section and end view, (drawn to an enlarged scale,) other features of our improvements. Fig. 7 illustrates a modification of part of our invention. Figs. 8, 9, and 10 are views of the knot-tying device on an enlarged scale.

Like letters indicate the same parts throughout the drawings.

(Here follow diagrams marked pp. 869 to 872, incl.)

A is the main frame of the machine. B is the driving-wheel. C is the gathering-reel. D is the binder-board. The remaining parts are hereinafter specified.

We prefer the following mechanism for operating the knife-bar *a*—that is to say, we mount in suitable bearings a cranked shaft, *b*, outside of the main frame A and the driving-wheel B. The crank $b'$ on one end of the said shaft is connected by the pitman-rod *c* to the pin on the pitman crank-wheel, while the crank $b^2$ at its other end is connected by a rod, *d*, to the knife-bar or sickle *a*. Therefore the said shaft *b* receives from the pitman crank-wheel a vibrating or to-and-fro motion, which it transmits through the crank $b^2$ and rod *d* to the knife-bar *a*. By this arrangement or contrivance we effect the important object of having the parts of the mechan-

(No Model.) 4 Sheets—Sheet 1

# J. HOWARD & E. T. BOUSFIELD.

## GRAIN BINDING MACHINE.

No. 274,772. Patented Mar. 27, 1883.

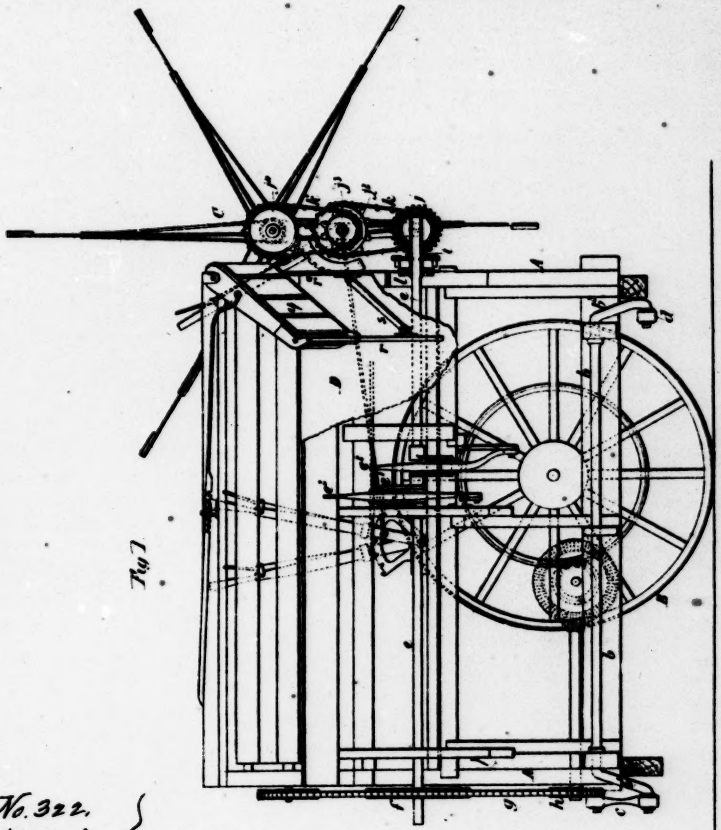


Fig 1

No. 322.
Deering
v.
M.N.W. et al.
p. 869

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(No Model.) 4 Sheets—Sheet 2

J. HOWARD & E. T. BOUSFIELD.

GRAIN BINDING MACHINE.

No. 274,772. Patented Mar. 27, 1883.

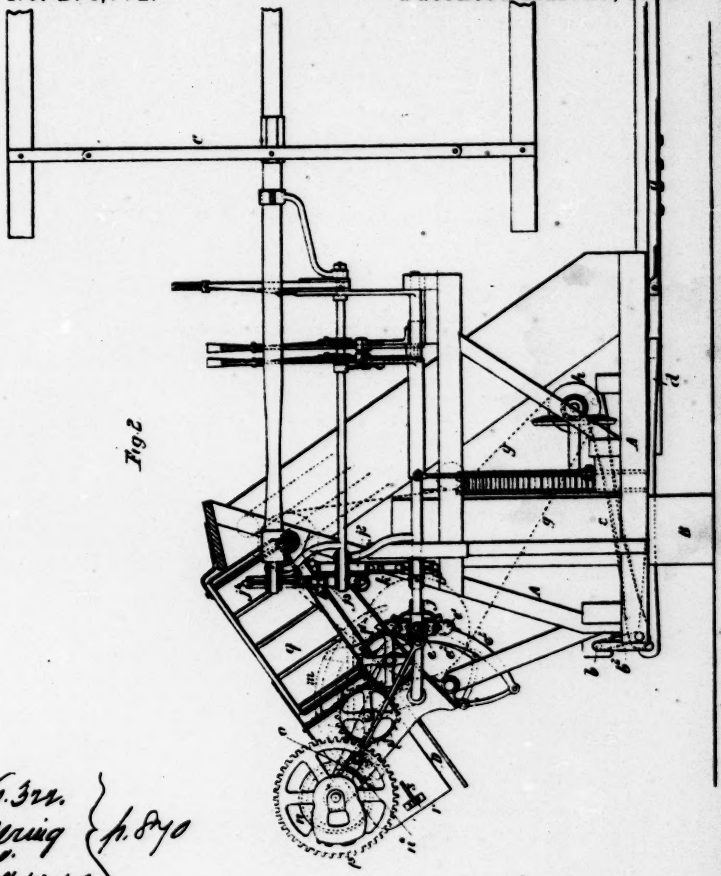

Fig. 2

No. 322.
Deering
v.
W. H. W. del.
p. 870

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(No Model.) 4 Sheets—Sheet 3.

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## GRAIN BINDING MACHINE.

No. 274,772. Patented Mar. 27, 1883.

No 322
Deering
v.
W. H. W. et al.
h. 871

Fig 3

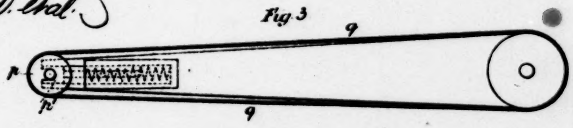



Fig 4

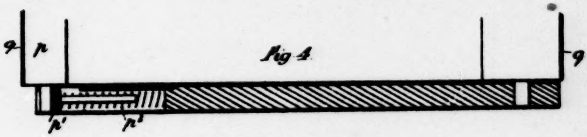



Fig 5

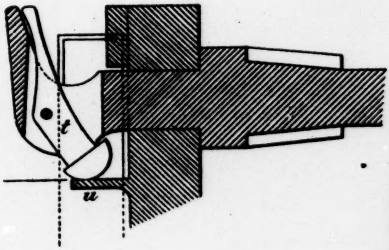



Fig 6

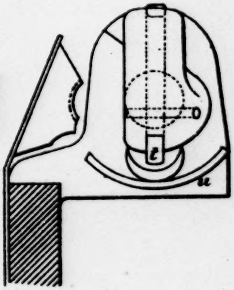
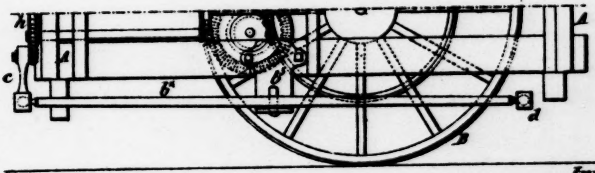



Fig 7

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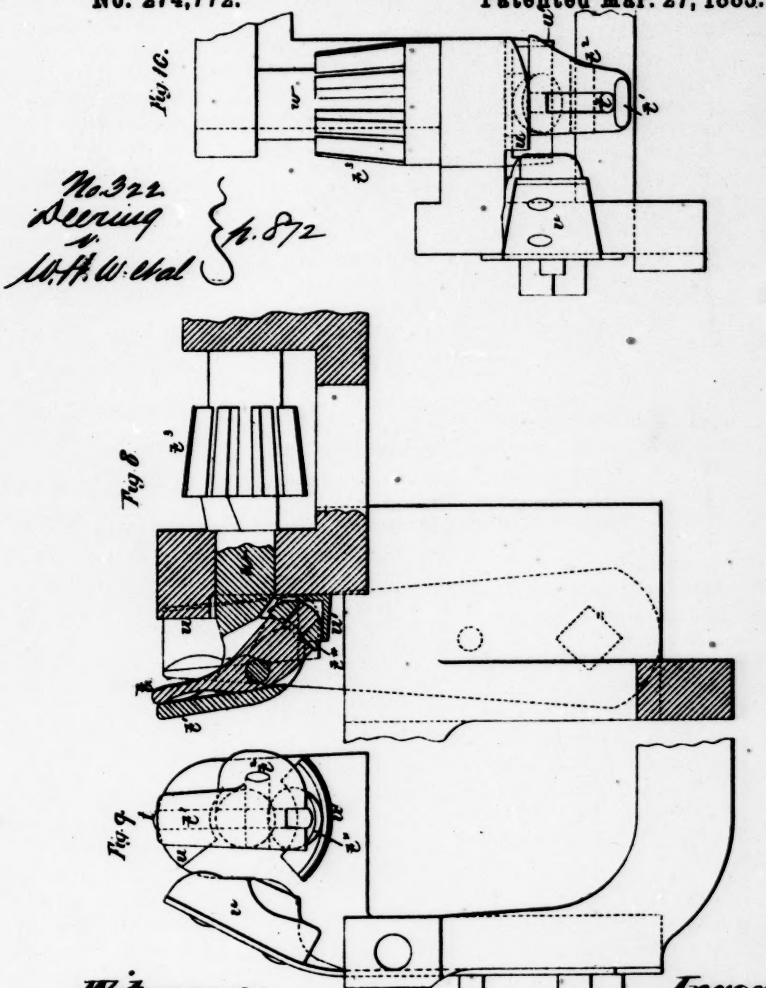
(No Model.) 4 Sheets—Sheet 4.

# J. HOWARD & E. T. BOUSFIELD.

## GRAIN BINDING MACHINE.

No. 274,772. Patented Mar. 27, 1883.

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ism for operating the said knife-bar easily accessible, so that they may be readily inspected or examined at all times, and any repairs, if necessary, may be conveniently effected. The same results are obtained by the arrangement illustrated in Fig. 7, wherein a lever, $b^*$, vibrating on the stud $b^3$, replaces the shaft $b$, the said lever being connected at its opposite ends to the pitman-rod $c$ and connecting-rod $d$.

The shaft, which we term the "binder-driving shaft," is mounted in suitable bearings on the frame-work A, and is cranked about the middle of its length, as shown at $e'$, for giving the necessary to-and-fro motion to the compressing or packing levers $e^2$. At the rear of the machine the said binder-driving shaft $e$ carries a chain-wheel, $f$, to which extends a pitch-chain, $g$, from the pitman crank-wheel $h$. At the front of the machine the said binder-driving shaft $e$ has keyed thereon a bevel-pinion, $i$, for giving motion through the bevel-wheel $j$, the chain-wheels $j'$ $j^2$ $j^3$ $j^4$, and the chains $k$ $k'$ to the gathering-wheel C. The said shaft is also provided with a pinion, $l$, for driving the binding mechanism through the gear-wheels $l'$, $l^2$, and $l^3$. This shaft is also provided with an automatic clutch, whereby the pinion $l$ is engaged and disengaged, so that the binding mechanism is put into and out of gear with the said shaft each time a sheaf is bound.

$m$ is the binder-arm, and $n$ is a wheel, provided with teeth at $n^*$, which in the revolution of this wheel are alternately in and out of gear with the pinion at $o$, and thereby serve to rotate the knotting devices at the proper times during the working of the binding mechanism.

It is obvious that the shaft $e$ may be arranged to drive the gathering-reel without actuating the binding mechanism.

When a revolving apron is used for the purpose of regulating the position of the cut grain endwise on the binder-board, as shown in Fig. 1, we adopt the following arrangement, viz: To one extremity of the pivoted frame which carries the said revolving apron we hinge a board, $r$, which we term a "butting-board," and which is connected by a radial jointed rod, $s$, to the shield-plate $r^*$.

874 This arrangement permits the said butting-board to be kept at a right angle to the sheaf on the binder-board, although the revolving apron $q$ may be set in various positions to suit the length of the straw. Moreover, this butting-board assists materially in making the bottom end or base of the sheaves even or level.

The part of our improvement which relates to the knotting device of these machines has for its object to obtain a more perfect control of the movable jaw of the knotting device shown and described in the specification of British letters patent granted to us February 24, A. D. 1880, No. 821, and which is used in a modified form in the machines described in the specification of the aforesaid patent No. 212,420. According to this part of our invention, $t$ $t'$ are two jaws of the knotting-hook. The jaw $t'$ is attached to or forms part of the shaft or spindle $w$ of the hook, and the jaw $t$ is jointed to the said jaw $t'$, as shown. This jaw $t$ has a head or roller, $t^*$, which is arranged to work as the hook rotates in contact with

the fixed cam *u*, whereby the said jaw is opened at the proper time to admit the cord or string between the two jaws *t t'*. The spring *v* serves to close the said jaw *t* when the roller *t** leaves the inclined surface of the cam *u*. The aforesaid hook has a curved or inclined face at $t^2$, which guides the string and acts in conjunction with the jaws *t t'* in the formation of the knots. The hook turns in one direction—that is to say, its motion is not reversed during the working of the machine, movement being imparted to the said hook through the pinion $t^3$. The said hook is arranged above the binder-board D in such a position relatively to the binder-arm *m* that the latter will lay the string or cord properly upon it and in front of the jaw *t*. In addition to the fixed cam *u* for opening the movable jaw *t*, we provide a second or auxiliary fixed cam, *u'*, arranged to close the said jaw at the proper times. This auxiliary fixed cam is used for keeping said jaw closed and preventing injury to the same when operating without string around the jaws.

We claim—

1. The combination, with the traveling apron for regulating the position of the cut grain on the binder-board or table D, of the automatically adjustable butting-board, substantially as and for the purpose specified.

2. In a sheaf-binder knotting mechanism, the combination, with the movable jaw *t'* and the fixed cam *u* for operating the same, of the spring *v* and auxiliary fixed cam *u*, substantially as and for the purpose set forth.

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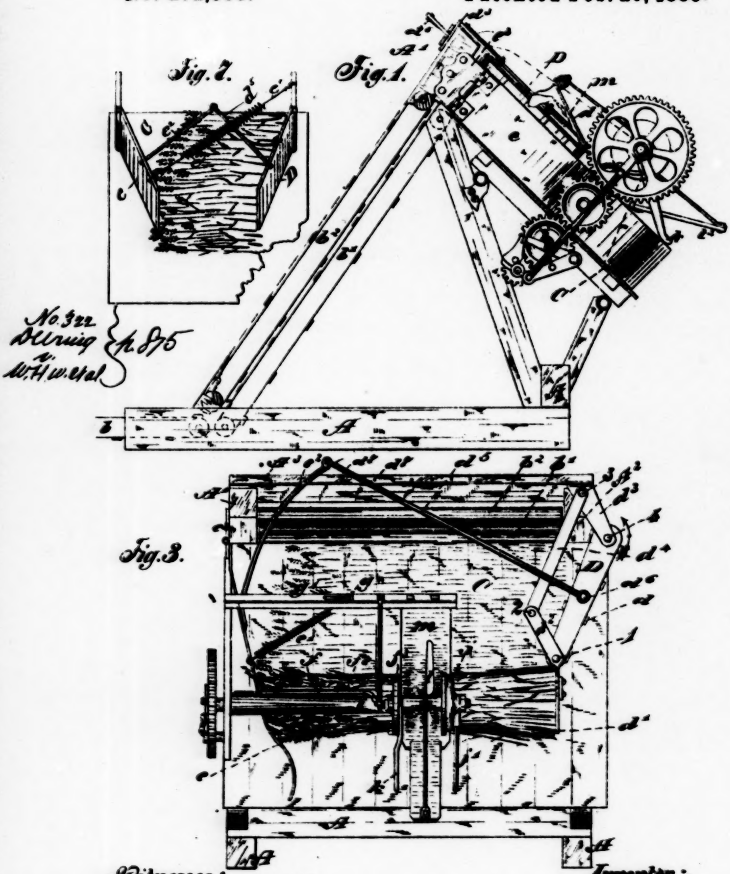
(No Model.) 2 Sheets—Sheet 1.

J. F. STEWARD.

GRAIN BINDER.

No. 272,598. Patented Feb. 20, 1883.

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John B. Kashari

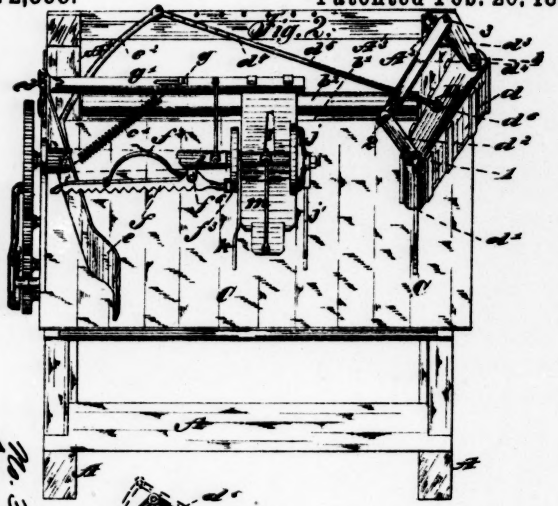
Inventor:
John F. Steward

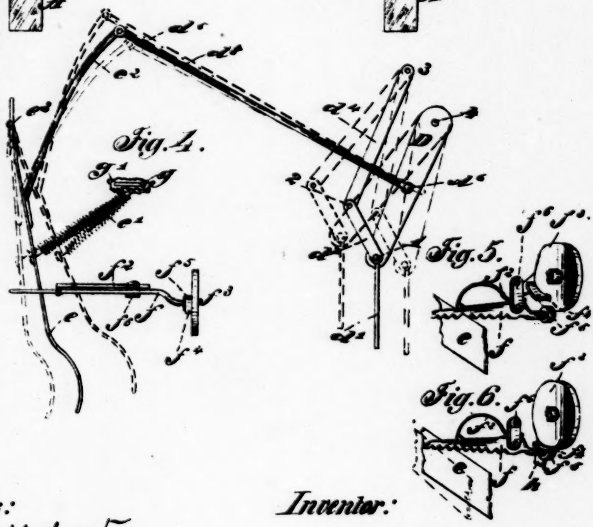
(No Model.) 2 Sheets—Sheet 2.

# J. F. STEWARD.

## GRAIN BINDER.

No. 272,598. Patented Feb. 20, 1883.




No. 322
Deering
W. H. W. Val.
p. 876

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877 UNITED STATES PATENT OFFICE.

JOHN F. STEWARD, of Chicago, Illinois.

*Grain-binder.*

Specification forming part of Letters Patent No. 272,598, dated February 20, 1883. Application filed October 9, 1882. (No model.)

To all whom it may concern:

Be it known that I, JOHN F. STEWARD, of the city of Chicago, county of Cook, and State of Illinois, have invented certain new and useful improvements in grain-binders, of which the following is a full specification, reference being had to the accompanying drawings, in which—

Figure 1 is a rear end view of the frame-work of the harvester, showing the binder in its proper relation thereto. Fig. 2 is an outer or stubble side view of the same. Fig. 3 shows the parts as viewed from a point above and in a line at right angles to the decking of the binder. Fig. 4 shows the various positions assumed by the parts that constitute my invention. Figs. 5 and 6 are details. Fig. 7 shows a modification.

(Here follow diagrams marked pp. 875 & 876.)

The object of my invention is to provide means that, combined with an automatic grain-binder, shall make it automatically regulate the position of the band on the gavel—that is, shall automatically place the band upon the gavel in its proper position relative to the length of the grain without any aid or attention from the operator; and its nature consists in locating, in such a position as to be influenced by the heads of the incoming grain, or gavel or bundle, a device to be moved thereby, the said device connected with means for adjusting the relative positions of the said grain and the binding mechanism. Under the principle involved many methods may be resorted to to attain the result. I have selected and developed what appears to me to be the most feasible plan. Several subordinate ends are reached by the different elements of the device, which will be pointed out.

My invention is capable of being applied to any form of binder, but I here show it applied to one now much used. I will describe the binder only so far as is necessary to a correct understanding of my improvement.

In the drawings, A is the frame-work of the harvester, upon which the binder is mounted; *b*, the platform-canvas; *b'* and $b^2$, the elevating-canvases.

C is the chute-board or decking, onto which the grain is deposited in a loose state by the elevators, and it is slotted to permit the packers and needle to work through it.

D is the grain-adjusting mechanism, consisting of a frame carry-

ing a roller at each end, around which rollers is drawn the endless canvas *d*. The larger or upper roller is driven from the gearing of the harvester in the usual manner, and moves in the direction indicated by the arrow in Fig. 3. The adjuster-frame vibrates on the axis of this upper and driving roller. So far the adjusting and butting mechanism does not differ from many in use, and constitutes no part of the present invention, only as combined with other elements.

$d^3$ is an arm secured to the top of the post $A^2$, overreaching the decking parallel therewith, and to this arm above and to the deck below is pivoted the swinging frame D.

*d'* is a thin board or plate of metal, as wide as the adjusting-canvas, and pivoted to the frame of the latter at its lower extremity. From this board reaches upward and inward (see Fig. 3) an arm, $d^2$. The board and arm are as one piece; but the board itself is made in two parts, so that its greater portion (which is the lower) can be removed.

Near the end of the arm $d^2$ is pivoted the bar $d^4$, connecting the arm $d^2$ with the overreaching arm $d^3$ near its top. In this arrangement we have four pivots, numbered 1, 2, 3, and 4. The distance between 1 and 2 is equal, or nearly so, to that between 3 and 4, and the distance between 1 and 4 to that between 2 and 3. In effect, then, the parts D, $d^2$, $d^3$, and $d^4$ describe a quadrilateral having substantially equal and parallel sides, so that to whatever point the frame D is swung in its adjustment the arm $d^2$ will remain parallel with the fixed arm $d^3$, and the board *d'* will always remain parallel with the edge of the decking, close to and over which the whole vibrates.

$d^5$ is a connecting-rod pivoted at $d^6$ to the frame D, the adjustment of which it controls, and reaches upward and backward over the decking, passing near the top rail $A^3$ of the harvester-frame. It is provided with the holes $d^7$ at a point where it passes the top rail, in which latter holes are also provided, so that by means of a pin passing through one and entering the other the whole device can be secured in any position; but it must be remembered that this means for securing the parts in place is but for use in special cases, which will be hereinafter pointed out.

878 The board *d'* is of such length as to reach as low as the accumulating gavel and prevent the grain forming it while accumulating from working or jarring forward. The butting or adjusting mechanism is given an amount of variation in its adjustment from a line parallel with and over the front edge of the chute-board to a point so far backward as to carry short grain sufficiently far back to be bound centrally. Three positions are shown in Fig. 4.

*e* is a board or plate of metal, nearly equal in width to that of the adjusting-canvas *d*. It is pivoted to the post A' of the harvester by any suitable means. I show it hinged to a plate, $e^3$, bolted to the said post. It lies in a position to the deck or chute-board corresponding with that of the adjusting-canvas. This board or plate is nearly straight from the pivotal point downward to nearly its lower

extremity, where it curves forward toward the bundling devices and then backward. The form may be much varied, but I consider the curvature here given best. When the gavel is in the position to be bound it is still just above the curve in the plate, as seen in Fig. 3.

$e'$ is a spring secured at one end to the upper edge of the board $e$, at about the middle of its length, the other end of the said spring being attached to a bolt, $g$, adjustable in a slot in the bar $g'$ of the frame-work of the binder. By this means the plate $e$ is caused to press elastically toward the grain, when not restrained by locking mechanism hereinafter explained, and the elastic pressure is adjustable as circumstances may require.

$e^2$ is an arm secured to the board $e$ at its upper edge and near its top or hinged end, the said arm reaching upward over and parallel with the decking and connecting by a joint with the rod $d^5$. By this means the movement of the board or plate $e$ is transmitted to the adjuster D, so that it moves in a reverse direction. In other words, the two parts, operating one on the heads and the other on the butts of the grain, are so connected that they approach or recede from each other when one is moved. These parts, because of their weight, are inclined to swing apart, and also, because of the tendency of the motive power on the canvas $d$, to swing its frame outward, and hence the spring $e'$ must be strong enough to overcome these tendencies, and as much stronger as is wished to have the parts moved quickly by the said spring when it is at liberty to move them.

With the above-described parts in the positions shown in Fig. 3, and the bundle as there shown, it is plain that if the bundle is quickly ejected it must engage the curved part of $e$ and force it out of its way, and hence backward, and the butting-canvas being connected thereto it will be moved forward. Two forces then are apparent—the bundle to force the parts opposing its head and butt from each other, and the spring to retract them. In order that each bundle shall leave the parts fixed for the time being in any position it may have caused them to assume, I provide a locking device that shall at all times retain the parts, except just while the head of each bundle is passing the curve on the plate $e$, which device is constructed as follows:

From the arm $i$ of the binder-frame (cut away in Fig. 2 to show the latching device) I depend a support, $f^6$. To this is pivoted the lever $f$, which lever is notched upon its lower edge. The position of this lever is such that its notched edge rests upon the upper edge of the plate or board $e$. From its pivotal point this lever reaches forward a short distance to the disk $f^3$, and is provided with an anti-friction roller, $f^5$, which is engaged and moved by the cam $f^4$ on the said disk, the latter being keyed to the knotter-driving shaft, which makes one complete revolution to each operation of the binding mechanism. The lever is thus lifted from off the plate $e$ once in each revolution for an instant. The time of this lifting is made to correspond with the action of the discharge-arms $j'$ and $k$, so that when they have engaged the bundle to eject it the plate $e$ shall be

free to respond to any pressure of the bundle while the latter is passing its curved end.

$f^2$ is a spring acting upon the latch-lever $f$ to return it quickly to its place for engagement with the plate $e$ after being acted upon by the cam $f^4$.

$m$ is the breast-plate between the tying mechanism (not shown) secured to it and the grain being bound. $l$ is a slot for the passage of the needle. $j$ is the knotter-rotating gear, to which is secured the discharge-arm $j'$. To the disk $f^3$ is secured the discharge-arm $k$.

Before describing the operation of the parts conjointly, I wish to state that certain parts of my invention are capable of use singly as well as conjointly, and I will first point out such independent action, believing that their joint action will be more quickly understood. First, if the pivot-bolt connecting $e^2$ and $d^5$ and the locking device be removed, and a pin is inserted into the holes in the top rail and through the holes $d^7$ in the connection $d^5$, I have an adjustable butting mechanism supplemented by the board $d'$ for preventing the gavel from working forward by the jarring of the machine, which shucking out of position is often very great in grain that is heavy at the butts; secondly, with the same parts removed, I have an elastically-swinging board for directing scatterings caused by imperfect adjustment of the reel of the harvester or any other cause into the gavel, whether the grain be long or short, and especially when short, as without this board there is a clear space between the heads of the gavel and the rear limit of the chute, where scattering may pass freely to the ground.

With the parts all connected, as best shown in Figs. 2 and 3, I have, as before stated, a device for regulating the position of
879 the grain relative to the binding mechanism, the operation of which I will now describe.

The use of the canvas $d$ and the board $e$ produces a new and beneficial result in their joint action upon the grain. In grain that stands thin on the ground, and hence is of that condition which always passes up the elevators head first, the butts are advanced by the revolving canvas and the heads are retarded by the contact with the board $e$, and thus reach the binding-receptacle in much better condition than when the old devices, or none, are used. The cut grain falls on the platform-canvas and is conveyed to and elevated by the elevating-canvases and delivered in a loose state onto the table, when it is engaged by the usual pushing mechanism and forced forward to the binding mechanism, where it is bound, and from which it is finally ejected by the discharge-arms or other means. With the butting mechanism, and the board or plate $e$ in their positions nearest approaching each other, we will suppose the grain first acted upon to reach them. If the grain is long, the head of the bund'e, when discharged, will press forcibly against $e$, more especially against its curve, and force it backward, it being at the proper instant permitted to move by being unlocked by the action of the cam $f^4$. The first bundle thus bound may be carried too far backward in its approach to the binding mechanism, and hence bound too near the butt; but when it is discharged the butt-adjust-

ing device acts under the influence of the plate *e*, and is hence moved forward to a position more nearly in keeping with the requirements, and the next bundle will be bound farther from the butt. If when going into a field of short grain the butt-adjusting mechanism and plate *e* are wide apart, the first bundle will be deposited too far forward in the receptacle, and hence bound too near the heads; but upon its discharge the board *e* will be permitted to jump or swing with a quick movement to a position as far forward as the position of the bundle at that instant will permit, and hence the butting mechanism will be set for short grain. If the device is set to proper position for the first bundle before going into the grain, it will be properly bound, and it will leave the parts in position for the succeeding one.

For the sake of clearness, I will further say the butt-adjusting mechanism in all cases directs the grain to the binding devices, (except litterings that are thrown backward.) The position to which the butt-adjuster is swung determines the relative position of the gavel to the binding mechanism. The passage of a bundle so long or far backward that its head will forcibly move the swinging plate when the latter is unlocked will cause the butt-adjusting mechanism to move forward and deposit the succeeding grain in a position farther forward in relation to the binding devices. If grain of decreasing length passes, the spring *e'* will cause the plate *e* to jump, when unlocked, until it meets the heads of the same, and the butt-adjusting mechanism thus be moved to deposit the grain of each succeeding shorter gavel a little farther back in relation to the binding mechanism.

It may seem to those theoretically versed in the art, yet unfamiliar with the operation of harvesting machinery in actual work, that the adjustments will not be perfect; but when the fact is taken into account that the change of length of grain which the machine advances to meet is generally gradual, and that the gavels increase and decrease in length gradually, the movement imparted to the regulating device will be competent to do its work, which it does in practice to a remarkable degree.

The modifications that may be made in this arrangement are almost unlimited. For instance, the butting device may be of any kind competent to give the swath direction into the receptacle, or it may be of the kind that moves the gavel bodily endwise. The board or plate *e* may be connected with the butting mechanism in various ways, and the plate *e* itself may be varied, yet should any device be used capable of being influenced by the heads of the grain, whether in swath, gavel, or bundle, for the purposes set forth, I should consider it an equivalent. The spring *e'* may be connected with the butting mechanism direct as to any of the moving parts. The locking arrangement may be varied, and even dispensed with under some circumstances. These suggested modifications are shown in an additional figure—that numbered 7. In this the grain is shown as operated at each end by the two plates or boards, and it is plain that as the distance between these boards at their delivery end is regulated by the length of the grain, the butt-board will

be caused to deliver the incoming grain properly. This would be used in that class of binders where the grain accumulates in the receptacle in a free state, and is taken bodily therefrom by the needle. The plate *e* may be located upon the elevator and connected with the adjusting or butting mechanism and produce the same effect.

In the modification shown in Fig. 7, C is the deck, and D the butt-adjuster. *e* is the swing-board, located so as to be influenced by the heads of the grain. $e^2$ and $d^5$ are stiff arms, reaching from their respective boards and meeting in a joint, being so connected if one moves the other must do so, but in a reverse direction. Now, if the spring *e'*, or any spring, is attached as shown in Fig. 3, the boards will be drawn together with a slight stress, and any body of grain passing through will spread them apart at their lower extremities. It is plain that whatever the length of grain passes, its center will always be at the same place.

What I claim is—

1. In a grain-binder, the combination of the butt-adjuster with means, substantially such as described, for setting the butt-
880 adjuster for operation on the flowing grain, said means being adapted to be operated by the grain, as and for the purpose described.

2. The combination of the adjusting mechanism of a grain-binder with means, substantially such as described, for automatically setting the adjuster for directing the grain into the binding mechanism, as set forth.

3. The combination of the swinging revolving canvas for advancing the butts of the grain with the board *e* for retarding the heads of the same.

4. The combination, with the delivery apparatus of a harvester, of a self-setting plate, *e*, on the binder-table, adapted to be operated by the grain for directing scattering grain into the succeeding gavel, substantially as described.

5. The combination, with the harvester delivery apparatus, of the self-setting plate *e* and the spring *e'*, adjustable in its tension, substantially as described.

6. The combination of the board *e*, spring *e'*, bolt *g*, and slotted bar *g'*, substantially as described.

7. In a grain-binder, mechanism for adjusting the butts of the grain, said mechanism adapted to be adjusted by the action of the grain.

8. The combination, with the harvester delivering apparatus and the elastically-yielding butt-adjusting mechanism, of means, substantially such as described, for varying the stress of elasticity, as set forth.

9. In combination with the bundle-discharging mechanism of a grain-binder, the board *e*, for the purposes set forth.

10. The combination of the discharge-arms, the board *e*, and the butt-adjusting mechanism, substantially as described.

11. The combination of the self-setting board *e*, and locking mechanism, substantially as set forth.

12. The plate or board $e$ and connecting mechanism as means for transmitting the power exerted by the spring $e'$ and swath or bundle of grain to the butt-adjusting mechanism, substantially as described.

13. The combination of the spring-latch with the board $e$, substantially as described.

14. The combination, with the board $e$, of the butt-adjusting mechanism and the board-locking mechanism, substantially as described.

15. The combination of the board $e$ and butt-adjusting mechanism with intermittently-operating mechanism for locking the board $e$, substantially as described.

16. The elastically-yielding butt-adjusting mechanism, in combination with locking mechanism, substantially as described.

17. The combination, with the self-setting butt-adjusting mechanism, of the latch $f$ and cam $f^4$, substantially as described.

18. The combination of the board $e$, arm $e^2$, connecting-rod, $d^5$, butt-adjusting mechanism, and board $d'$, substantially as described.

19. The combination of the board $e$ and board $d'$, substantially as described.

20. The combination, in a grain-binder, of moving butt-adjusting mechanism and the board $d'$, substantially as described.

21. The combination of the swinging butt-adjuster, the arms $d^2$, $d^3$, and $d^4$, and the board $d'$, pivoted to the swinging butt-adjuster, substantially as described.

JOHN F. STEWARD.

Witnesses:
LAURENCE BEALING.
JOHN H. B. KASPARI.

883 UNITED STATES PATENT OFFICE.

JOHN F. STEWARD, of Chicago, and ROBERT H. DIXON, of Ravenswood, Illinois.

*Grain-binder.*

Specification forming part of Letters Patent No. 267,119, dated November 7, 1882; application filed March 6, 1882. (No model.)

To all whom it may concern:

Be it known that we, John F. Steward, of Chicago, and Robert H. Dixon, of Ravenswood, both in the county of Cook and State of Illinois, have invented certain new and useful improvements in grain-binders, of which the following is a full specification, reference being had to the accompanying drawings, in which—

(Here follow diagrams marked pp. 881 & 882.)

Figure 1 is a view taken from the outer side of and slightly above the edge of the binder; Fig. 2, a rear end view; Fig. 3, a detail front end view, showing the gearing for giving motion to the binding mechanism. Fig. 4 shows the packer-shaft, with all the parts mounted thereon distributed along its length in open order to better display them; Fig. 5, a sectional view of the driving sprocket-wheel. Fig. 6 shows one method of pivoting the top of the swinging adjuster; Fig. 7, a perspective of the adjuster-frame; Fig. 8, a detail of the mechanism for changing the path of rotation of the packers.

The object of our invention is to provide efficient means for compacting the grain received from the harvester into the receptacle into which it is to be bound, and against a compressor adapted to yield and trip the clutching mechanism for the purpose of making the binder wholly automatic, and to arrange an "adjuster" or "butting canvas" so that it shall be more efficient than those now in use, and in other devices and arrangement of devices hereinafter claimed as new.

Our invention is here shown as adapted to the form of binder shown in the patent to John F. Appleby, February 18, 1879, and numbered 212,420; but the arrangement will differ somewhat if adapted to other forms.

In the drawings, A is the standard for supporting all the parts of the binder. It is shown in Fig. 1 as shortened by having a part of its length broken out. Its length should be such that the "butter" may be in line with passing butts and the needle be central with the straw to be bound—in other words, that the band-tying devices shall be in the center of the grain-table. In Fig. 2 it is shown with all the operating parts in relative position to the harvester-elevator, or, more properly speaking, in relation to the approaching grain.

(No Model.) 2 Sheets—Sheet 1.

# J. F. STEWARD & R. H. DIXON.

## GRAIN BINDER.

No. 267,119. Patented Nov. 7, 1882.

*Fig. 1.*

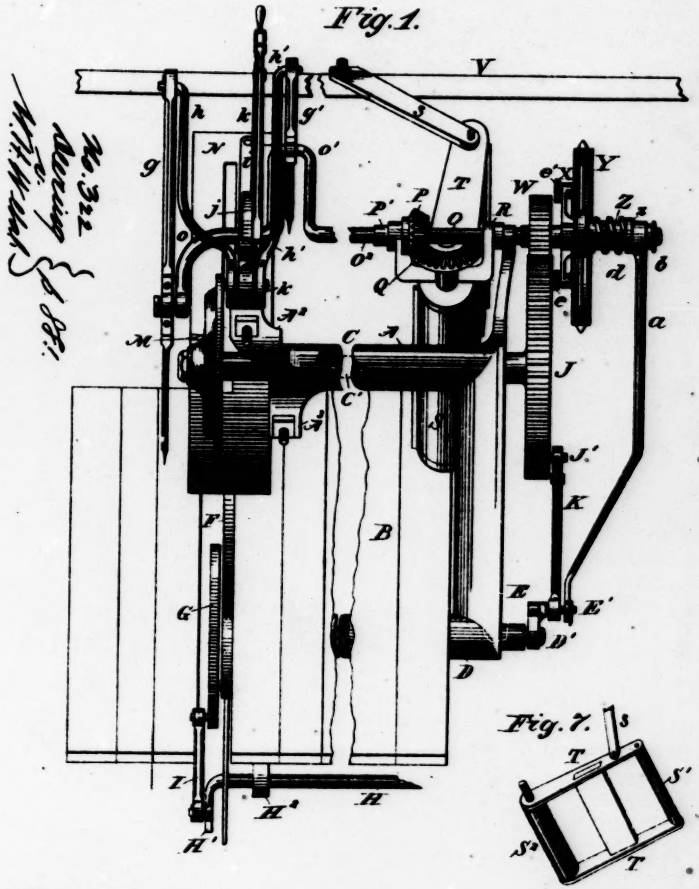



*Fig. 7.*




Witnesses,
John B. Haspar
Laurence A. Bealing

Inventor.
Robert H. Dixon
John F. Steward

(No Model.) 2 Sheets—Sheet 2.

# J. F. STEWARD & R. H. DIXON.

## GRAIN BINDER.

No. 267,119. Patented Nov. 7, 1882.

No 322,
Deering
1882
W. H. Webb

Fig. 2.

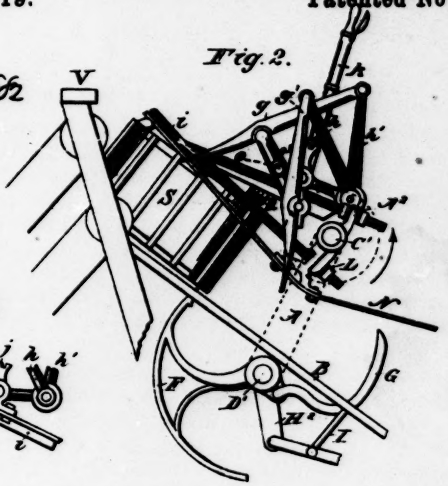



Fig. 8.

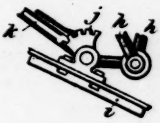



Fig. 5.

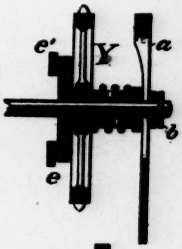



Fig. 3.

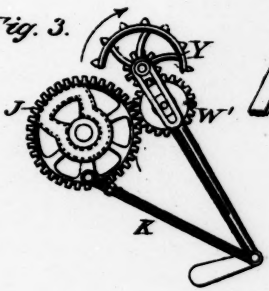



Fig. 6.

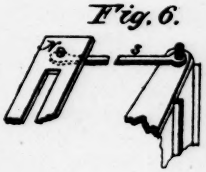
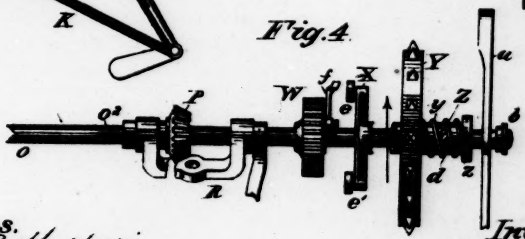



Fig. 4.




Witnesses.
John B. Haspari
Laurence A. Reeling

Inventor.
Robt H Dixon
John F Steward

It may be supported in any suitable manner that it or the harvester to which it is attached will admit.

B is the decking, forming the floor of the gavel-receptacle. The grain is discharged onto it by the usual delivery apparatus.

C is the hollow arm of the standard A, through which the knotter-operating shaft C′ passes.

D is the hollow arm of the standard, through which the needle-shaft D′ passes.

F is the needle.

E is a crank secured to the shaft D′.

G is the compressor, hinged to the heel of the needle, and connected to the rock-shaft having the crank H′ by the link I. The shaft H is supported from the standard by the lug $H^2$.

J is a gear mounted on the knotter-operating shaft, and gives motion thereto, and by means of the connection K, mounted upon the wrist-pins J′ of the gear J, and E′ of the crank on the shaft D′, which gives motion to the needle. M is a wheel mounted on the other end of the shaft C and secured thereto, and gives motion to the tying mechanism. In Fig. 2 this wheel is represented in dotted outline.

L is the tyer-frame, hung loosely on the shaft C, and connected to the breastplate N, as shown, and having its end made adjustable in relation thereto, as will be more fully set forth.

The shaft H receives its rocking motion from the wheel J. As this arrangement of the shaft H and its operation are well understood and form no part of this invention, we will not describe them, but refer to the patent cited above.

N is the breastplate, slotted for the passage of the point of the needle. This is supported by the tyer-frame L and the bracket *i*.

O is a shaft provided with the oppositely-disposed cranks *o* and *o*′. This shaft is journaled at a point between the opposing cranks *o o*′ in a bearing *j* on the adjustable bracket *i*. The shaft is otherwise made straight and provided with the groove $o^2$. On this shaft is mounted the sliding bevel-pinion P, provided with a feather. By connecting the pinion to the shaft in this manner it may
884 move longitudinally thereupon, and yet be given rotation thereby. Mounted loosely on the shaft is also the frame R, which forms a bearing in which the hub of the pinion P may revolve. Properly speaking this frame is supported at both ends by the shaft O and slides on it.

Q is a bevel-gear mounted on and secured to the small shaft of the roller or drum $S^2$ and giving motion to the adjusting-canvas S. The shaft is journaled in the frame R.

T is a suitable frame for the adjuster-canvas. The rollers S′ $S^2$ are journaled in this frame. The adjuster is pivoted at its upper end, as hereinafter described, and the lower end is adjustable along the shaft O. Its upper end is connected by the link *s* to the breastplate N. In Fig. 1 the link *s* connects it to the top rail, V, of the harvester. It is preferable to connect it as in Fig. 6, because by so doing it is wholly connected with the binder.

W is a pinion mounted loosely upon the shaft O. It meshes with

the gear W′, which in turn meshes with the gear J. W′ is but an intermediate to cause W and J to revolve in the same direction. It performs the same office that a chain would if thrown over the wheels W and J, if they were sprocket-wheels.

X is the driver, fixed to the sprocket-wheel Y, or cast as a part of its hub. Upon its ends are mounted the rollers *e e′*, which engage with the dog *f*, pivoted on the wheel W. The dog is retained in proper position to be carried by whichever roller may engage with it by any suitable spring. The dog and driver constitute a form of automatic clutch in common use. (See also the patent referred to.) Any automatic clutch will work equally well. The driving sprocket-wheel revolves freely on the shaft O. The hub of this wheel is supplied with the clutch-teeth *y*. We have then the wheel provided with the clutching mechanism on either side.

Z is a clutch sliding slightly on and feathered to the shaft O. This clutch has a flange, *z*. Between this flange and the wheel Y, surrounding both, is the stout spiral spring *d*, the purpose of which is to force the clutch Z out of engagement when permitted so to do.

*b* is a collar on the end of the shaft O.

*a* is a slotted bar connected at one end to the wrist-pin E′. Its slot is made as wide as the diameter of the shaft, and moves on it.

The extreme end is thickened, as shown, and as this bar reciprocates along between the clutch Z and the collar *b* it acts as a wedge to force the clutch to slide on the shaft, or withdraws, so that the spring may disengage the one from the other. The wheel Y rotates constantly, but the shaft O is not rotated unless Z engages with the clutch on the hub of the wheel Y. The driver X is fixed to the wheel Y, and unless the dog *f* is engaged with it the pinion W is not rotated. The shaft O is bent so as to form, or is otherwise provided with, the cranks *o o′*. Upon these and carried by them are the packers *g g′*, supported at their upper end by the adjustable links *h h′*, and the lower or working ends are made so long as to reach below the breastplate and the points so directed as to be thrust over and into the approaching grain. The links *h h′* are pivoted at their lower ends to a lever *k*, pivoted to the ratchet *j*, which is mounted on the bracket *i*. The lever has a latch-bolt, which locks it in any position.

The upper arm of the standard A has two lugs, $A^2$ and $A^3$, one above and one below. They have holes through them, and are so far separated as to form a good support for the brace-bracket *i*. This bracket is made strong, so as to form a support for the parts shown connected with it. Its upper branch is preferably made wide and ribbed, or made of T-iron. The lower branch may be round. They unite at the upper end and support the breastplate. Their lower ends are threaded for some distance and pass through the lugs $A^2$ $A^3$. The threaded ends of this bracket are provided with nuts, which serve two purposes, that of a fastening and as means of adjustment of the bracket, and with it the tyer-frame L, in relation to the wheel M. This wheel M is keyed to the shaft C, and is at rest while the binding mechanism is not in motion.

The frame by which the tyer is supported, and in which it is

journaled, is supported from (by surrounding) the shaft C, and at the other end by being secured to the breastplate N. Now, this tyer-frame being secured to the breastplate, it will be seen that if the said breastplate is moved and the tyer-frame swung on the shaft C it changes the relation of the tyer-frame to the wheel M. The tyer, holder, and cutter being driven by this wheel, and being mounted in the tyer-frame, the relative movement of one or the other will change the time of operation of the parts—that is, if the wheel, revolving, as it does, in the direction indicated by the arrow in Fig. 2, engages the tyer and other parts to operate them early in its movement, it will be "fast." If the reverse is the case it will be "slow." The tyer-frame being adjustable, if moved downward—that is, toward the compressor—the parts referred to will be slow in their operation, and if adjusted upward they will be fast in their movement. By turning the nuts so as to lengthen the upper fork of the bracket *i* the breastplate will be depressed, and with it the tyer-frame. By lengthening the lower in relation to the upper the reverse adjustment as to timing will take place. This adjustment is especially desirable in setting up the binder, and the necessity arises from variations in the parts. The adjustment of this bracket will effect somewhat the relative position of the breastplate and packers to the decking, but, being slight, will work no injury.

The binders using tripping mechanism are usually so constructed that they may be set to bind bundles of any uniform size by adjustment of the tripping-lever. We produce the same result by varying the stroke of the packers.

885 The links *h h'* being sustained upon the lever *k* at their feet, if the said end of the lever be moved downward the link will be moved in the same direction, and the working ends of the packers will then approach less near to the tripping-compressor, and thus the space into which the grain is packed will be larger, and hence more grain will accumulate before tripping. A reverse movement of the lever will of course produce a smaller bundle. The lever *k* must be so located as to be within reach of the driver or attendant. It is locked in any position by the ratchet *j* and latch on the lever.

The operation of our invention is as follows: The grain is delivered by the elevator or other means to the packers. A chain is thrown over the sprocket-wheel Y from any running-wheel of the harvester, so as to revolve it in the direction indicated by the arrow. The clutch Z engages with that on the hub of the wheel Y, and will give rotation to the shaft O, and the cranks will carry the packers through their movements and pack the grain against the trip or compressor. When this pressure becomes sufficient the clutching mechanism *f e* will be engaged and the binding mechanism be put in motion, the wheel J will be rotated, and the shaft carrying the wheel M. The connection K will impart motion to the needle-shaft, and as soon as the crank E begins to move the slotted bar *a* will be carried with it, and as soon as its wedge-shaped end passes far enough the stout spring *d* will disengage the clutch Z and the shaft O be permitted to stop its rotation and the packers to remain

at rest during nearly the whole movement of the binding mechanism. The grain will thus be not packed against the needle while it is across the throat formed by the deck and the breast-plate. When the revolution of the wheel J is completed and the slotted bar brought to the position shown in Fig. 1 the clutch Z will be forced into engagement with its mate and the packers be started.

The clutching mechanism for the binder proper does not differ in its operation from those now in common use, and needs no explanation. It is well shown in the patent before cited.

To direct the grain to such a position in relation to the needle as to present its middle to the twine, the adjuster is swung on its pivoted support, so that the pinion P may be adjustable anywhere along the length of the shaft O. If the lower end is moved toward the needle, it will carry short grain, as desired. This adjuster, by being operated as shown and described, is preferable to those in use, and the advantages possessed by it are due to its arrangement, and as this arrangement constitutes one part of our invention we will speak of it more definitely. It is constructed so as to connect this revolving apron to some part of the binder, preferably, as here shown, connected with the shaft O, so that it may act on the butts of the grain while upon the receptacle proper and on its way to the tying mechanism. The adjuster has heretofore in practice been connected with and operated by some part of the harvester. Motion was given to the roller S′ continuously, and the result of running the canvas from this roller was this: If the grain fell in something of a mass, or if the canvas, by stretching, became a little loose, the obstruction would tend to retard it, and such retardation would slacken it around its driving-roller. This difficulty is great, and to overcome it we have made the adjuster a part of the binder and drive it from its lower end, so that any retardation of its movement on its operating-side—that side in contact with the butts of the grain—will have the effect of making it hug its driving-roller more closely, and thus the defect mentioned be wholly remedied.

In the matter of the intermittent adjuster we do not wish to limit ourselves to driving it from the packer-shaft, as any other intermittent shaft, or a special intermittent shaft, will answer.

We have shown no means for adjusting the butting-canvas along its shaft, deeming it not necessary, as any lever or screw, or any of the usual means for adjusting it, may be used. That shown by Olin in his patent of February 4, 1879, will answer a good purpose.

What we claim as our invention, and desire to secure by letters patent, is—

1. The binder frame or standard constructed, as described, to form a support for the binder, gearing, and the grain-packing and butt-adjusting mechanisms, substantially as set forth.

2. In a grain-binder, an adjusting device operating to engage and advance the butts of the grain and deflect it lengthwise on the receptacle while the gavel is being formed, combined with mechanism to operate the same, and to intermit during the operation of the binding mechanism, substantially as described.

3. The combination, with the binder mechanism, of an inter-

mittingly-revolving shaft, and the grain-adjusting mechanism, arranged and operating substantially as described, whereby the shaft is started by the binder mechanism at or near the completion of its operation.

4. The combination of the intermittent shaft O, for carrying the packers, with the adjuster, also carried and operated by said shaft, substantially as described, whereby the packers and the adjuster have simultaneous intermittent movements.

5. The combination of the intermittingly-operated grain-adjusting mechanism with the intermittingly-operated binding mechanism, connected by means operating alternately, or each to cause the movement of one while the other is at rest.

6. The combination, with the wheel M, of the tyer-frame, supported from and made adjustable around the axis of the wheel, and the adjusting-bracket *i*, substantially as described.

7. The intermittingly-operated shaft O, with the cranks and packers, provided with ths double alternately-operating
886 clutching mechanism, in combination with intermittingly-operated binding mechanism, and the continuously-revolving wheel, Y, substantially as described.

8. The combination of the packer-shaft, provided with its cranks carrying the packing-arms, the pin-on P, sliding thereon, the pinion W, mounted loosely thereon, and the clutch Z, with the continuously-revolving wheel Y, carrying the described doubly-acting clutching devices, substantially as described.

9. In a grain-binder, the packing mechanism and means for adjusting the same at will, whereby the attendant may adjust their operative positions to vary the capacity of the receptacle for the purpose specified, substantially as described.

10. The combination of the cranks, the packers carried thereon and the pivoted links *h h'*, connected to the heels of the packers, and means whereby the links are adjusted in relation to the axis of revolution of the cranks for changing at will the path of movement of the operating-points of the packers, substantially as described.

11. The combination, with the frame A, of the bracket *i*, forming a support for the shaft O, and for the links *h h'*, substantially as described.

12. The combination of the bracket *i*, the packer-shaft mounted thereon, and the lever *k*, the ratchet *j*, links *h h'*, and the packers, arranged and operated substantially as described.

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888 UNITED STATES PATENT OFFICE.

JOSEPH P. BULLOCK and JOHN F. APPLEBY, of Beloit, Wisconsin.

*Grain-adjuster for Harvester-binders.*

Specification forming part of Letters Patent No. 266,949, dated October 31, 1882. Application filed September 2, 1879.

To all whom it may concern:

Be it known that we, Joseph P. Bullock and John F. Appleby, of Beloit, in the county of Rock and State of Wisconsin, have invented a new and improved grain-adjuster for harvester-binders; and we do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making part of this specification.

(Here follows diagram marked p. 887.)

Figure 1 is a top view of the grain-elevator and receiving table or surface of a harvester adapted for binding and provided with our grain-adjusting attachment. Fig. 2 is a vertical section thereof in a plane indicated by the line *x x*, Fig. 1. Fig. 3 is a horizontal section of the grain-adjuster detached. Fig. 4 is a vertical cross-section of the same at the line *w w* of Fig. 3.

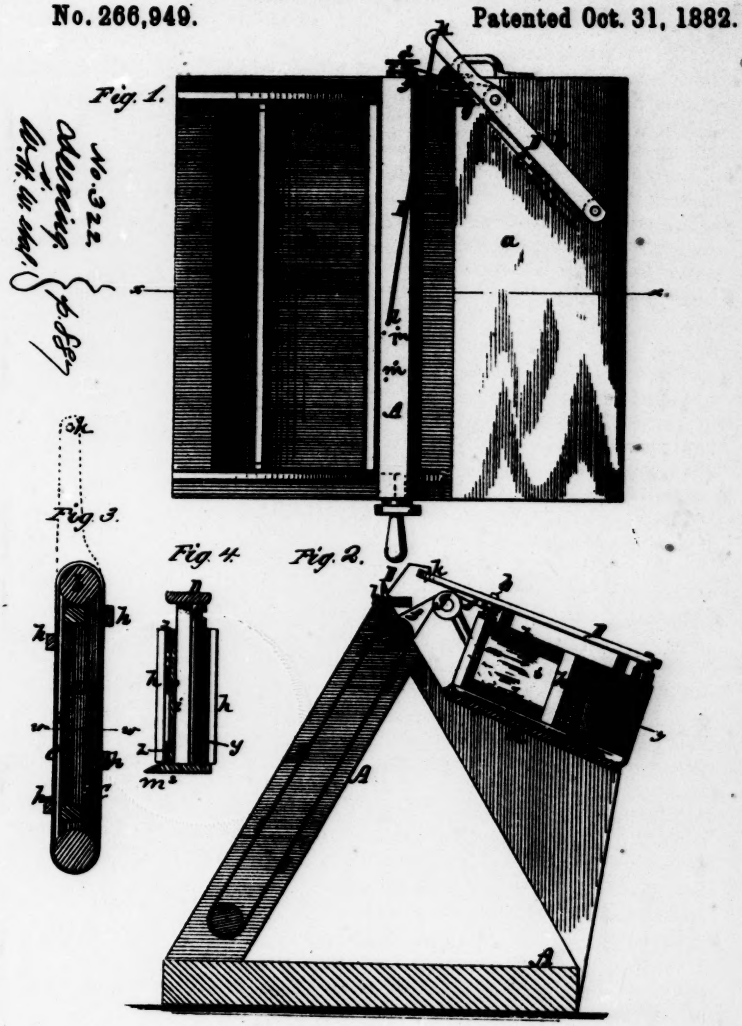
The same letter designates the same part in all of the figures.

As is well known to those familiar with the subject-matter of machinery for the cutting and binding of grain, it is always desirable to have the binding of the cut grain—*i. e.*, the tying of the gavels into sheaves—done at a given point lengthwise of the bunch of stalks, (about the middle thereof;) and as, in harvesters adapted to have the binding done on the machine, the cut grain is usually delivered with the butts in a given relative position to the grain-conveying contrivance, some means must be adopted to compensate or provide for the variable lengths of the cut grain, so that the latter, be it of long or short growth, may be bound with equal facility and at about the same point lengthwise of the gavel or bundle. One of the usual provisions for the accomplishment of this object has been the employment of some sort of means by which those appliances of the harvester which serve or contribute to the purposes of binding may be adjusted relatively to those parts of the machine which perform the operations of cutting the grain and conveying it to the locality at which it is to be gathered into gavels and bound into sheaves. Another provision for the accomplishment of this object has been in the use of a deflector composed of a board arranged edgewise on the receiving-table, pivoted at its upper end, and adapted to be set and held at different angles, according to the length of the grain, and designed to cause the descending stream of grain to be shifted sidewise; but the construction of a machine adapted to the cutting and binding of grain with the binder por-

J. P. BULLOCK & J. F. APPLEBY.

GRAIN ADJUSTER FOR HARVESTER BINDERS.

No. 266,949. Patented Oct. 31, 1882.




Witnesses
Fred J. Dietrich
Alex. Scott

Inventors,
Joseph P. Bullock,
John F. Appleby,
By J. S. Brown
their attorney.

tions adjustable relatively to the other parts is not, however, desirable, provided that the binding could be as efficiently and conveniently done with these two parts of the machine maintained always in a fixed relation toward each other, especially in that species of machines in which are used what are called "automatic" or "self-binding" mechanisms; and in practical operation a plain-faced deflector board or surface is not an efficient means for effecting the designed adjustment of the grain-stalks endwise. The butt-ends of the stream of grain will lag by contact with the stationary surface of such a designed deflector or adjuster, and the grain will not be properly guided to the binder or the point at which the binding is to be done.

To provide for use a harvester in which the binding of the cut grain (either by hand or by automatic binding mechanism) may be more efficiently and conveniently done than heretofore while operating on grain of various lengths (or heights of growth,) and without having to change the relative positions of the grain cutting and conveying and the binder portions of the machine, is the main object of our invention, which to this end consists essentially in the employment of an adjuster and deflector composed of a traveling operative surface mounted in an adjustable frame and provided with suitable means for operating it, and by which the cut grain, while passing from the delivery end of the conveyer to the binder, shall be perfectly adjusted lengthwise of its stalks and to an extent corresponding to the length of the grain, so as to effect the presentation of the grain always in a given relative position to the binder devices of the machine and in the proper condition for binding, all as will be hereinafter more fully explained.

In the accompanying drawings, A represents the frame, and B the elevating-apron, of one of the well-known forms of elevator contrivance for carrying upward from one side of the grain-platform or carrier-apron (and discharging at one side of the harvester) the cut grain; and *a* represents an inclined descending receiving table or surface, extending from the uppermost end of the apron B. This descending table or receiving surface *a* is made, as shown, about equal in length (from its front to its rear edges) to the middle of the endless apron B, and of a width sufficient to permit the reception and adjustment upon it of the discharged grain before the passage of the latter to a point at which it is to be gaveled, (either by hand or by mechanism for performing that operation.) On top of the said descending table or surface *a*, and at or near its forward inner corner, is pivotally attached the novel adjusting device or contrivance, which consists of an endless apron, C, mounted on suitable rollers located at either end of a frame, D, the said frame being arranged vertically and edgewise of its apron on said table *a*, and being capable of adjustment about its point of pivotal attachment in a manner and for a purpose to be presently explained.

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The adjusting-apron C may be, and is by preference, provided with a series of projecting slats or ribs, *b*, which will strike against the butts of the grain and facilitate the descent of the latter at the

butt-ends while it is being adjusted lengthwise, and the said apron may be composed of either a single web widthwise, as seen at *y*, Fig. 2, or of two narrow webs, as seen at : : in said figure. In the last-mentioned form of adjuster-apron it is necessary and in the other desirable to have the contrivance provided, as shown at *i*, with a board located immediately back of the operative surface of the said adjuster-apron, in order that in one case the single web may be supported against the thrust of the grain-butts against which it has to act and in the other case the butts of the grain may be prevented from becoming entangled with the two narrow webs and other moving parts of the adjuster. For a like reason, and to prevent any grain from getting wedged in between the bottom of the adjuster and the table *a*, on which it rests, the bottom or frame piece, $m^2$, of the former is by preference made with a chamfered-off edge, as most clearly seen at Figs. 2 and 4. The apron C is driven (in the direction indicated by arrow at Figs. 1 and 2) by a belt, *f*, banded from the upper roller, *d*, of the elevator to the upper grooved end of the roller *b* of said apron, the belt *f* being properly guided and held in place while running by intermediate guide-wheels, *g g*, suitably mounted on the machine.

The adjuster-frame D being mounted to swivel or turn on an axis coincident with that of the roller *b*, the turning of said frame (to set it at different degrees of obliquity to the axis of the upper end of the elevator-apron) may be effected without any derangement of the belt and pulley driving devices of the apron C, and the upper bar of the said frame D being extended, as seen, said frame may be conveniently held in any required position by means of a rod, E, one end of which is connected at *k* to said extended portion of the frame D and the other end, *l*, of which is made to engage with some one of a series of holes, *m*, in the top of the elevator-frame A.

In view of the foregoing description and what is clearly shown in the drawings, but little explanation of the mode of operation of the contrivance made the subject-matter of our application seems to be necessary.

It will be understood that when cutting grain of the greatest height to which the harvester is adapted the adjuster-frame D should be set to a position nearly or quite at right angles to the line of discharge from the upper end of the elevator-apron B of the stream of grain, and that as the grain being harvested may be more or less short the adjuster must be set at a greater or less angle than that shown in the drawings to perform the function of guiding and forcing backward and endwise the stalks of the stream of grain being discharged from the upper end of the elevator-apron B, and thus insuring the placement of the stalks in the proper relation endwise to the binder to insure the convenient and successful application of the cord or band to the middle of the gavel; and it will be seen that by thus adjusting the outflowing stream of grain between the point of its exit or discharge from the elevator and the point at which it is designed to be subjected to the binding operation the binding may be efficiently performed by the same machine on

grain of different lengths without any adjustment relatively of the binder devices and the elevator mechanism.

It will be understood that by our improved adjuster we are enabled to not only act on the stream of grain while it is in a descending and sort of floating condition, so to speak, but to affect the butt-ends in a positive manner in two ways, viz: first, in a manner tending to deflect their course of travel, and, second, in a manner to feed along (rather than retard the travel of) the butts during the deflection widthwise of the stream of grain; and it will be seen that by the addition to the traveling deflective surface (of the adjuster) of the ribs *h*, or devices for making the feeding of the butts by the adjuster more positive, a greater degree of perfection in the general operation of the contrivance is attained, while by hanging the adjuster so as to vibrate about the axis of its upper apron-roller, *b*, the movement of said adjuster (to set it at various angles) does not interfere with the simple means provided for driving the apron thereof.

What we claim as of our invention, and desire to secure by letters patent, is—

1. In combination with the receiving table or surface of a harvester provided with an elevator which discharges the cut grain onto said table, a deflector and adjuster having a traveling operative surface and means for causing said surface to move at a proper speed, all substantially as set forth.

890 2. A deflector or adjuster provided with an endless apron and mounted on or over the receiving-table of a harvester, so as to vibrate, for the purposes of adjustment, about an axis coincident with that of the upper and driving roller of the apron, as and for the purposes set forth.

3. An endless belt moving in the direction of the grain-delivery and operating in contact with the stubble end of the grain on its passage from the elevator to deliver it to a binding mechanism, substantially as set forth.

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898 UNITED STATES PATENT OFFICE.

JOHN F. STEWARD, of Plano, assignor to Elijah H. Gammon and William Deering, of Chicago, Illinois.

*Grain-binder.*

Specification forming part of Letters Patent No. 266,913, dated October 31, 1882. Application filed August 16, 1878.

To all whom it may concern:

Be it known that I, John F. Steward, of Plano, Kendall county, State of Illinois, have invented new and useful improvements in grain-binders, of which the following is a full description, reference being had to the accompanying drawings, in which—

(Here follow diagrams marked pp. 891 to 897, incl.)

Figure 1 is a top or plan view; Fig. 2, a rear end elevation; Fig. 3, a side elevation; Fig. 4, a cross-section; Fig. 5, a bottom view of the pivoted table and its attached devices; Figs. 6 and 6ª, detail views, on an enlarged scale, of the rake-arm and its attachments; Figs. 7 and 8, enlarged details of the mechanism for operating the sector-frame which actuates the twisting devices; Figs. 9, 10, and 11, details of the devices for supporting the wire-spool; Figs. 12, 13, and 14, details of the devices for stopping the movement of the binding mechanism; Fig. 15, an inverted plan view, showing a detail of the wire-cutter.

This invention relates to automatic grain-binders; and its objects are to improve the construction and operation of the rake or arm which carries the grain to the binding mechanism, the devices for compressing the bundle for binding, the devices for severing the wire and operating the twisting and cutting devices, the manner of supporting the wire-spool, and generally the construction and operation of the binding mechanism. These objects I attain by the construction and arrangement of mechanism illustrated in the accompanying drawings, which I will now proceed to describe in detail, afterward pointing out my invention in the appended claims.

The machine represented in the drawings belongs to that class in which the grain is elevated over the main or drive wheel and delivered to the binder for binding.

The parts indicated by the letters A B C D E F G H I J may be of any of the well-known forms of construction for such parts in machines of this class.

The completed machine is to be provided with the ordinary appliances—such as carrier-platform, elevator, sickle, grain-wheel, divider, &c.—used in machines of this description; but as such appliances are constructed, located, and operate in the usual manner they are neither shown nor described.

The receiving-table K is so located as to receive the grain from

7 Sheets—Sheet 1.

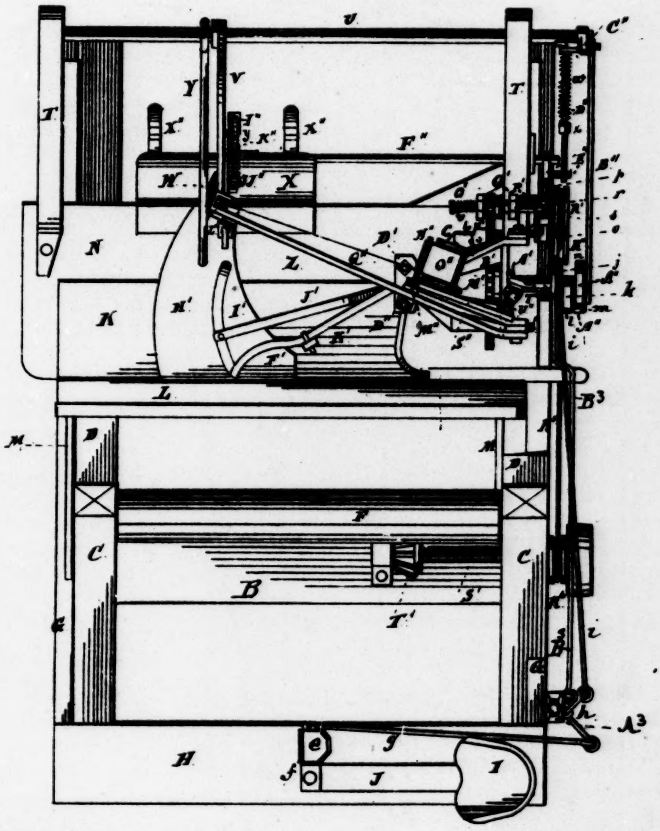
# J. F. STEWARD.

## GRAIN BINDER.

No. 266,913. Patented Oct. 31, 1882.

No 322
Deering
v.
W. H. W. et al
p. 891

Fig. 1.



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7 Sheets—Sheet 2.

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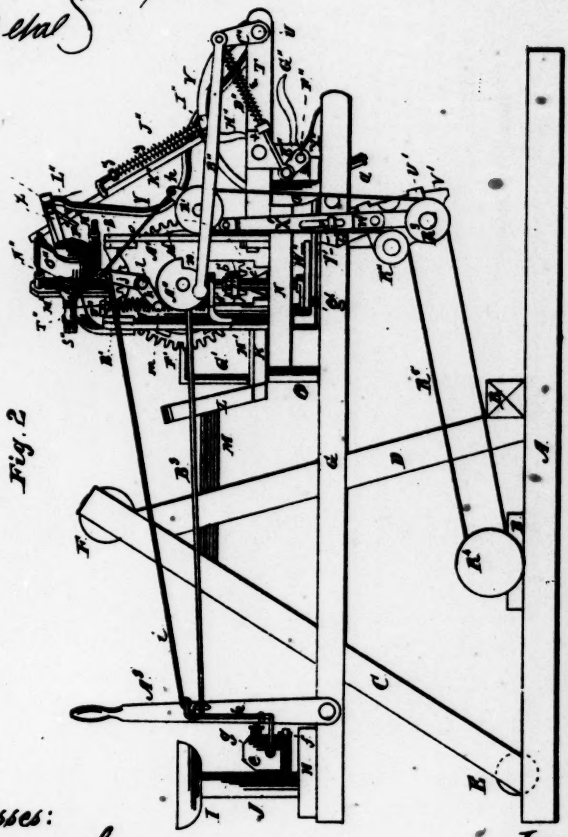
## GRAIN BINDER.

No. 266,913. Patented Oct. 31, 1882.

No. 322,
Deering
vs.
W. H. W. et al

Fig. 2



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7 Sheets—Sheet 3.

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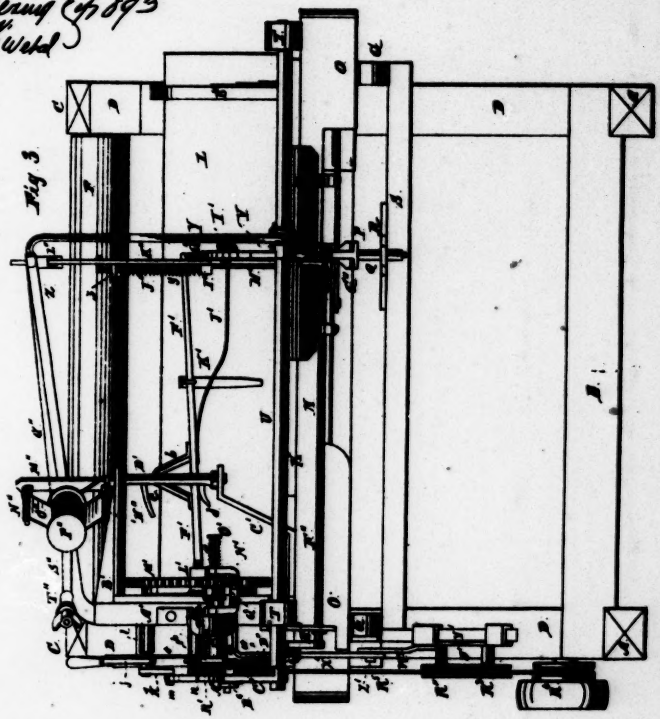
GRAIN BINDER.

No. 266,913. Patented Oct. 31, 1882.

No. 322 Allowing of 893 W. H. Weld

Fig 3



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7 Sheets—Sheet 4.

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GRAIN BINDER.

No. 266,913. Patented Oct. 31, 1882.

No. 322
Deering
v.
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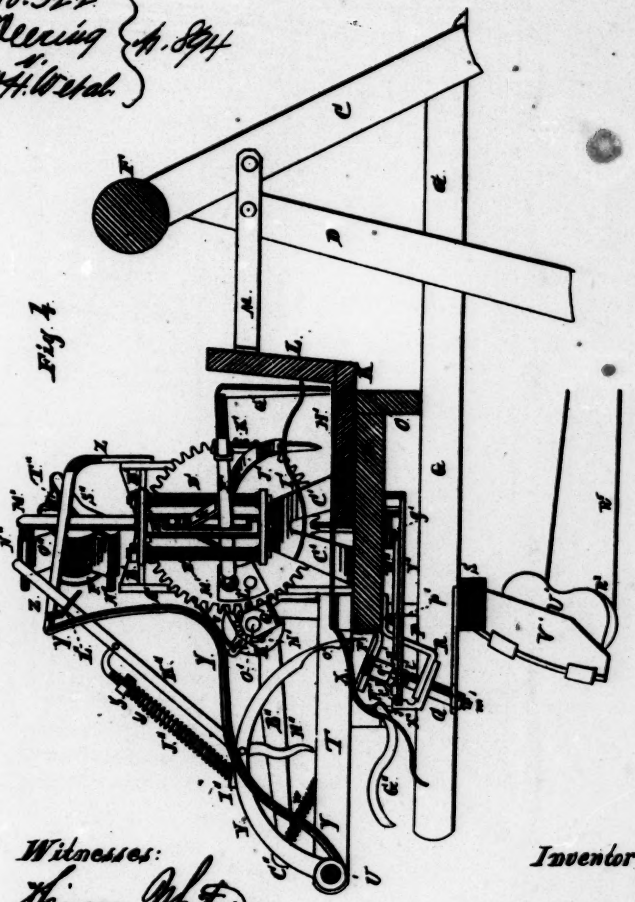
} A. 894

Fig. 4



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7 Sheets—Sheet 5.

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GRAIN BINDER.

No. 266,913. Patented Oct. 31, 1882.

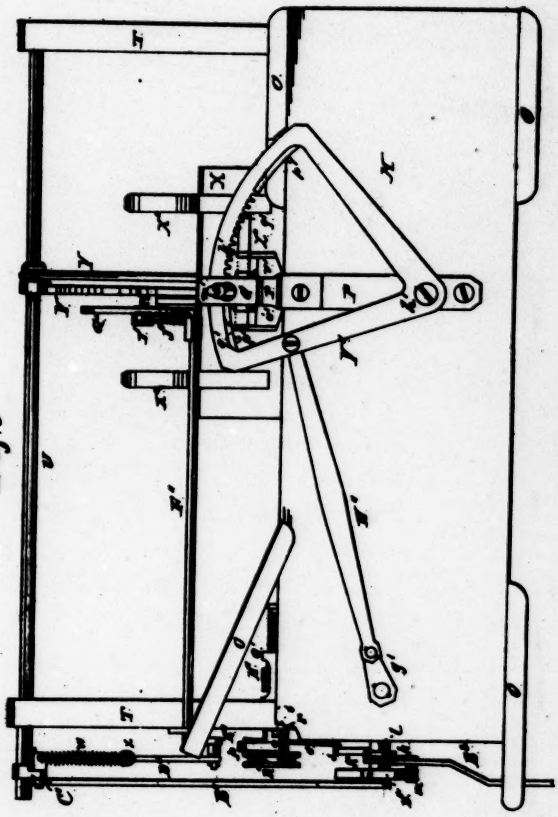

Fig. 5.

No. 322 Deering W. H. W. Val } h. 595

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7 Sheets—Sheet 6.

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## GRAIN BINDER.

No. 266,913. Patented Oct. 31, 1882.

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Fig. 6.

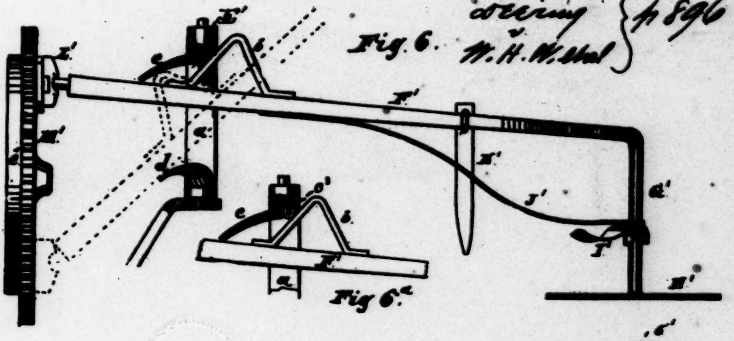

Fig 6a.

Fig. 7.

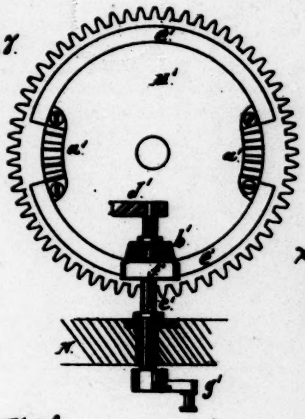

Fig. 9

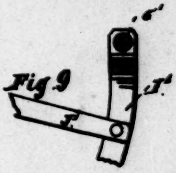

Fig. 10

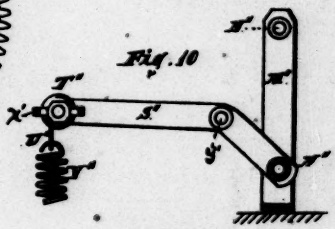

Fig. 11

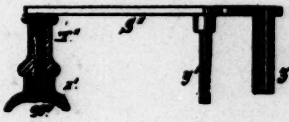

Fig. 8.

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7 Sheets—Sheet 7.

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## GRAIN BINDER.

No. 266,913. Patented Oct. 31, 1882.

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Fig. 12.

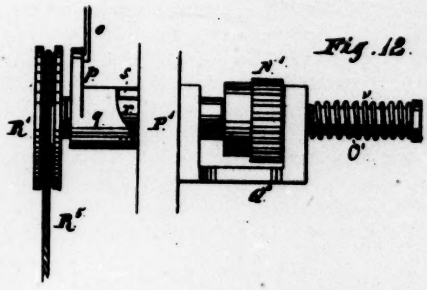



Fig. 13.

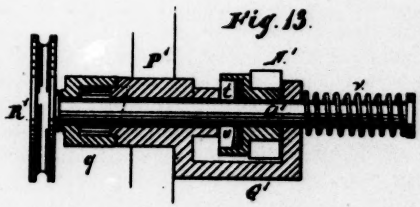
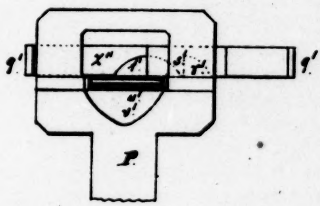
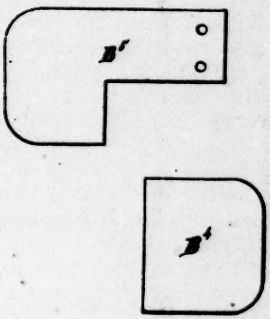



Fig. 14.

Fig. 15.

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the upper elevator-roller, F, and, as shown, is provided with a back board, L, to which is secured one end of the bars or supports M, the other ends of which are secured in any suitable manner to the elevator-frame C D, as shown in Fig. 4, by which means the table is supported in its position. Beneath this table K is located the table N, which supports the binding mechanism, and which, as shown, is provided with legs or supports O, which rest upon the bars G and keep the table in a level position. To the under side of this table N is secured a metal bar, P, consisting of an upper and lower portion, as shown in Fig. 4. To the lower portion is secured the upper end of an inclined metal socket, Q, the bar being bent to give the desired inclination and the end of the socket projecting slightly above its support. The lower end of this socket passes through a suitable opening in the outer end of a metal plate or support, R, the inner end of which is secured to a cross-bar, S, in any suitable manner, the cross-bar being secured to the under side of the bars G. This socket not only forms a pivot for the table N, but also forms a bearing for the twisting device, the shaft *m'* of which passes through the socket, and is held in place by means of a pin or other suitable device. In order to bring the twisting device into proper position to grasp the binding-wire, the socket is inclined, as shown.

By making the socket Q serve both as a pivot for the table and a bearing for the twisting device, no matter in what position the table may be swung the twister will always be operative, because the point where the twisting is performed remains stationary, the location being at the center of the pivotal point of the table. The table is swung on the pivot or socket Q by the hand lever $A^3$, connected with the binding mechanism by the rod $B^3$, secured to the bearing for the shaft of the wheel M', as shown, or secured to some other portion of the rake-carrying frame A'. By swinging
899 said table N on its pivot the binding mechanism can be adjusted to bind grain of different lengths at or near the center, irrespective of the delivery of the grain onto the receiving-table.

The shaft U has its bearings in the outer ends of the bars T, which are secured, as shown, to the upper side of the swinging table N. To this shaft U is secured the binder-arm V, the location on the shaft being such as to bring the arm in line with the twisting device and the pivotal point of the table N, so that the descent of the binder-arm will be the same, irrespective of the position of the table N, and thereby bring the binding-wire, which passes through the opening in the point thereof, in position to be acted upon by the twisting device. A suitable opening, W, is provided in the plate X for the passage of the binder-arm V for this purpose. This plate X is secured at one edge to the top of the table N, and is bent or curved so as to form a suitable device for supporting the bundle while being bound, and to serve as a guard for the binding devices. To its outer edge, as shown, are secured arms X'', which form supports and guides for the bundle when being discharged, the object being to carry the bound bundle a sufficient distance from the binding devices to insure its proper discharge.

The brace rod or bar Y is supported at its lower end on the shaft U, and is bent or curved, so as to extend up and over the binding-table, to form a support for the outer end of the bar Z, secured thereto, the inner end of which bar is secured in any suitable manner to the frame A′. This bar Z serves as a wire leader or guide, the binding-wire passing from the spool over an anti-friction pulley located in the outer end of the bar.

On the rear end of the table N is secured in any suitable manner a frame, A′, which frame may be constructed in the form shown, or in any other form suitable for the purpose of supporting the wheel which operates the rake-arm and binding devices. The rock-shaft E′, which supports the rake-arm, has its bearings in suitable heads on the outer ends of the arms B′ C′, secured to the top and bottom of the frame A′, the heads being connected together by means of suitable tie-rods or braces, D′, one on each side of the rock-shaft. In this rock-shaft E′ is a long vertical slot *a*, at the lower end of which is secured a curved piece of metal, *d*, which projects to the rear of the shaft, as shown in Fig. 6, and at its upper end is secured a curved piece of metal, *c*, also projecting to the rear of the shaft. In the slot *a* is located the rake-arm F′, the forward end of which is provided with a suitable tooth or arm, G′, to engage the grain, and its rear end is held in a suitable socket, L′, secured to the face of the wheel M′, so that the revolving of the wheel will give the required vertical and horizontal movements to the rake-arm; but the arm will be given a high vertical movement because the under side will come in contact with the upper face of the curved projection *d*, which will act as a variable fulcrum for the arm, and the result will be that the front end of the arm will be raised to a higher altitude than if this elongated fulcrum *d* were not provided, thereby lifting the rake-arm so that its tooth on the return movement will not come in contact with the grain which has accumulated on the table K. On the upper face of this rake-arm F′ is a projection, *b*, formed so as to have a front and rear inclined face, the upper end of which is rounded, which projection is so located on the rake-arm that its upper end and rear inclined face will come in contact with the under face of the projection *c* during the upward movement of the rake-arm, and will remain in contact until the arm has passed over and back of the accumulated grain on the receiving-table K, and the grain for a bundle has been separated from the falling grain by the tooth G′, and is ready to be carried toward the binding mechanism, at which time the rear face of the incline *b* will come in contact with the end of the slot *a*, or with an anti-friction wheel, $c^3$, located therein, so that the arm will be held firmly down while sweeping across the receiving-table, carrying the grain to the binding mechanism. The metal plate H′ is secured to the top of the table beneath the tooth G′, to prevent the tooth from wearing a hole in the table.

The grain for the bundle is held while being swept across the receiving-table by the holder I′, bent or curved to receive the grain beneath it, and provided with an opening through which the tooth G passes, so that the holder can move up and down on the tooth.

The holder is supported by the spring J′, to one end of which it is permanently secured, and which extends back and is secured to the rake-arm just forward of the rock-shaft E′, so that the holder is free to adapt itself to any desirable quantity of grain.

On the arm F′, between the tooth G′ and rock-shaft E′, is secured a tooth, K′, the location being such as to cause it to engage with the heads of the grain, and to hold them so that they will move with the arm and not lag behind, as would naturally be the case, the heads being the lightest and the sweep of the arm being in the arc of a circle. The tooth or spur K′ prevents any lagging behind of the heads and delivers the grain to the binding mechanism in proper position for binding.

The wheel M′ is driven by means of a pinion, N′, supported upon a shaft, O′, having its bearing in the support P′, secured to the frame A′ and the yoke Q′, between the arms of which the pinion N′ is located, which yoke may be formed with the support P′, or be made separate and attached thereto. The shaft O′ slides back and forth in its bearing. The engagement between this shaft and the pinion N′ is effected by means of a pin, *t*, on the shaft, which engages with shoulders *u*, having inclined faces formed in the hub of the pinion N′, which are held in engagement by the coil-spring *v*, located on the shaft O′, between the yoke Q′ and a collar or pin on the end of the shaft. The other end of the sliding shaft O′ carries a crank, *p*, having a head or sleeve, *q*, turning loosely on said shaft, on which sleeve is an incline, *r*, the face of which comes in contact with the projection *s* on the side of the bracket or support P′, as shown in Figs. 3 and 12. so that as the head *q* is turned the shaft O′ will be withdrawn, disengaging the pin *t* from the shoulders *u*, and stopping the revolution of the pinion, and consequently that of the wheel M′ and the binding mechanism.

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To the end of the crank *p* is secured one end of a link or rod, *o*, the other end of which is secured to one arm, *j*, of a bell-crank lever, the head or pivot of which turns in a socket or support, *l*, secured to the frame A, above the socket or bearing of the shaft of the main wheel M′. The other arm, *k*, of the bell-crank lever is provided with an anti-friction roller, *m*, so arranged as to come in contact with the face of a wheel or disk, A″, which is secured to the end of the shaft which supports the wheel M′. The face of the disk A″ is not a perfect circle, but has a portion cut away so as to leave a depression or notch, *n*, into which the roller *m* can drop.

To the arm *j* is secured one end of a rod, *i*, the other end of which rod is secured to the upper arm or crank of the vertical rock-shaft *h*, supported in suitable bearings on the lever $A^3$. The lower arm of the rock-shaft *h* is secured to one end of a rod or link, *g*, the other end of which is secured near the upper end of the treadle *e*, which treadle is pivoted to the support *f*, secured at the foot of the seat-support J, so that the driver can place his foot on the treadle whenever desired.

The disk or wheel A″ is so arranged relative to the movements of the rake-arm F that when the rake-arm has completed its sweep-

ing movement across the plate H′ the depression *n* in the disk A″ will be in the proper position to allow the anti-friction roller *m* to drop therein, and withdraw the shaft O′ from its engagement with the pinion N′ and stop the movement of the rake-arm. To accomplish this result the driver depresses the treadle *e*, which, through the rod or link *g*, turns the rock-shaft *h* and draws the rod *i* toward the driver, which turns the bell-crank lever in its socket or support *l*, throwing the arm *k* down and forcing the roller *m* into the depression *n*. This falling of the arm *k* causes the other arm, *j*, through the rod or link *o* and crank *p*, to turn the head *q* on the shaft O′, bringing the incline *r* in contact with the pin or projection *s*, which acts to slide the shaft O′ in its bearing and withdraw the pin *t* from contact with the shoulder *u*, thereby stopping the movement of the pinion N′, and consequently the binding mechanism. The shoulder of the notch *n*, coming in contact with the roller *m* on the arm *k*, prevents the accidental movement of the wheel M′, and consequently the raking and binding mechanism. By means of this notched disk A″ and the described co-operating devices the driver can easily stop the movement of the mechanism for the purpose of allowing enough grain to accumulate on the table for another bundle, or for any other purpose, and such stoppage does not depend upon any automatic devices which act whether a stoppage is necessary or not, so that the operator has full control of the binding mechanism, and no matter in what position the table N may be the devices for withdrawing the sliding shaft will always be operative, because the rock-shaft *h* is supported and operates on the lever $A^3$, so that in whatever position the lever may be placed the shaft *h* will be in a corresponding position.

Near the outer edge of and below the table N is located the shaft F″, the bearings of which are secured to the plate X and the supporting-bar T. To the shaft F″ is secured an arm or lever, G″, curved as shown in Figs. 2 and 4, the location of which in relation to the wire-carrying arm V is such that it will move in a line with and near to the wire-arm, and its pivot is so located in relation to the delivery of the grain as to bring it below the point of binding, the object being to have the arm act as a compressor in connection with the wire-arm to compress the bundle and relieve the binding-wire from strain. For this purpose the movements of the arm G″ and the wire-arm V are directly opposite to each other—that is, when the wire-carrying arm descends the arm G″ will ascend, and *vice versa*. Movement is given to the compressor-arm G″ by the crank E″, secured to the end of the shaft F″, to which crank one end of the rod D″ is secured, the other end of which rod passes through a head or a stud secured to the end of the crank C″, which crank is permanently secured to the end of the shaft U, and is operated by means of the bar B″ from the wheel or disk A″, the arrangement of the cranks C″ E″ relative to each other and the arms G″ and V being such as to give the desired movements to said arms. In order that the movement of the compressor-arm G″ may be such as to adapt it to bundles of varying sizes, the rod D″, which operates the crank E″, is allowed to slip in its socket, by

which it is connected with the crank C″, the connection being made yielding by means of a coiled spring, *w*, one end of which is in contact with a collar, X, on the rod D″ and the other with the stud or socket on the crank C″. This spring is strong enough to operate the crank E″, and yet allow the rod D″ to slide through the head or socket when the arm G″ has completed the compression of the bundle, so that no injury can result if the crank C″ continues its movement after the arm G″ has compressed the bundle. The spring *w* readjusts the parts on the return movement of the crank C″.

Another form of compressor is provided by means of the arm or lever H″, pivoted directly to the wire-arm V, as shown in Fig. 4, which acts in conjunction with the wire-arm to compress the bundle, the movement of the wire-arm operating the arm H″. This arm H″ is provided with a head or socket, I″, at its upper
900 end, in which is located one end of the bar J″, the other end of which is secured to a sliding bar, K″. The lower end of the bar K″ is pivoted to the same pivot by which the arm H″ is secured to the wire-arm, and its upper end passes through a suitable slot in the support L″, rigidly secured to the stationary arm Z, near its outer end, as shown in Figs. 2, 3, and 4. The reciprocating movement of the wire-arm will operate the compressor-arm or lever H″, for as the wire-arm moves up and down it will slide the bar K″ back and forth in its support L″, which movement of the bar K″ will, through the rod J″ and head I″, operate the arm H″. In order that the arm H″ may adapt itself to bundles of varying sizes, the connection between the sliding bar K″ and the arm H″ is made yielding by means of the spring *y*, coiled around the rod J″, one end of which rests against a set-nut, *z*, on the rod, and the other against the head I″ on the arm H″, so that the rod is free to slide in its socket in I″ when the arm H″ has compressed the bundle.

It is not designed to use both the compressor-arms G″ and H″ on the same machine, although it may be found desirable in some cases to have both attached. Generally only one form of compressor will be used.

In operation, in both styles of compressor, the bundle will be compressed between the under face of the wire-arm and the compressor, the compressor G″ having a pivotal point and operating independent of the wire-arm, and yet working in unison therewith, and the compressor H″ having its pivotal point directly on the wire-arm and operating therewith.

To the head of the bars B′ is secured a standard, M″, near the top and bottom of which are secured spindles or pins N″, to which is secured a piece, O″, of leather or other suitable material, forming a backing, which acts as a tension-pad for the wire to prevent unwinding too rapidly.

The wire-spool P‴ is supported upon a spindle, *y′*, rigidly secured to the lever S″, which lever is formed as represented in Fig. 10, and is pivoted by means of the socket or long bearing *z′* to the lower spindle or pin, N″, so that the lever S″ is free to move up

and down. The other end of this lever S″ is provided with a small spool or roller, T″, mounted on the spindle *w′*, rigidly fastened to the lever, and held in place thereon by means of the thumb-nut *x′*, by means of which the roller T″ can be tightened so as to prevent its revolving on its spindle *w′*. To this roller T″ is secured one end of a cord, U″, the other end of which is secured to a coiled spring, V″, the lower end of the spring being secured, as shown, to the support *d′*; but it may be secured, if desired, to some other portion of the frame A′. The spool is supported on the lever S″ in such a manner that any undue tension—such as that caused by a knot in the wire or other obstruction—which would interfere with the proper unwinding of the wire by coming in contact with the backing or pad O″ or other cause will be released, because the yielding lever S″ will admit of the spool being drawn away from the pad by the action of the wire, thereby releasing the wire. The amount of yield is regulated, as shown, by the cord U″ and spring V″, the cord being wound on the roller T″ according to the amount of yield desired. The spring acts to draw the lever down after the obstruction has passed, so as to bring the wire again in contact with the tension-pad. The weight of the spool and the wire carried by it also acts to bring the wire in contact with the pad, so that the device acts as a self-regulating tension under all circumstances.

On the rear face of the wheel M′, directly opposite each other, are secured two cog-segments, *a′*, so arranged as to engage with the pinion *b′*, which is secured to the shaft *c′*, the bearings for the upper end of the shaft being in the support *d′*, secured to the frame A′, and for the lower end in the plate secured to the table N. On this rear face of the wheel M′ are flanges *e′*, which do not extend the entire distance around the wheel, but only from segment to segment *a′*. These flanges engage with the flat faces *f′*, formed on the hub of the pinion *b′*. (See Fig. 7.) By means of the cogged segments motion will be given to the pinion *b′*; but such motion will be stopped when a face *f′* is engaged with one of the flanges *e′*.

To the lower end of the shaft *c′*, which projects below the table N, is secured a crank, *g′*, to which is pivoted one end of the bar W″, the other end of which is pivoted to the frame Y″, as shown in Fig. 5, which frame is pivoted at *h′* to the plate or support P. This frame Y″ is of a sector shape, the center being at the pivot *h′*, and has a corresponding-shaped opening in its center. The outer edge of the frame is held in position by and moves in the groove *i′* in the head *j′*, which head is suitably secured to the lower portion of the bar or plate P. (See Fig. 4.) On the inner face, at the center of the perimeter of the sector, is a rack, *k′*, so arranged as to engage with the pinion *l′* on the shaft *m′* of the twister, which shaft has its bearings in the socket Q, as before described, and may be of any suitable construction. As shown, it belongs to that class of twisters in which the main wire is coiled around the shank of the hook or twister. Above the pinion *l′* is a collar, *n′*, having flat faces which come in contact with suitable flanges located on the sector-frame Y″, one at each side of the cogged segment, and pre-

vent the revolution of the twister while the cutting is being performed.

The cutting-blade Z″ is supported in a suitable head located on the upper portion of the bar P, and slides back and forth therein. This cutter consists of a single straight bar having an opening, *r′*, one edge of which is straight and the other curved, the straight edge being provided with a cutting-edge, *s′*, to sever the binding-wire, and a curved opening, *t*, in which the binding-wire can swing while the twister is making its forward revolution, and for the
901 passage of the wire-arm V to bring the wire within reach of the twister. On each end of this sliding shear or cutter Z″ is a downward lip or projection *q′* with which suitable projections, *p′*, on the sector-frame Y″, come in contact, so that as the frame is carried forward and back these projections will alternately strike the engaging points *q′* or the ends of the cutter and move the cutter back and forth in its guide ways. The mechanism for twisting and cutting is located beneath the plate X. The plate P, which supports the sliding shear-blade, is provided with an opening, *v′*, located below the opening W in the plate X, for the passage of the needle or wire-arm V. In order to prevent the binding-wire from being carried too far down, a roller, *u′*, is so located as to cause the wire to be taken therefrom in such manner that it will be wound on the shank of the twister. This roller is supported in suitable bearings secured to the upper portion of the plate P. The twister and cutter are thus both operated by devices secured to the same oscillating frame, and a simple and effective mechanism is provided for effecting the twisting and cutting.

In operation the binding-wire Q″ is carried around the bundle, which is compressed, as before described, and supported on the plate X. The wire-arm V passes over the bundle through the openings provided for it until the notch or opening *o′* therein is opposite the point of the twister, allowing the twisting device to revolve and engage the wire. At this time one of the segments *a′* will come in contact with the pinion *b′* and revolve it with its shaft *c′*, causing the crank *g′*, through the bar W″, to swing the sector-frame Y″ on its pivot, bringing the rack *k′* in engagement with the pinion *l′* of the twisting device, thus rotating the latter and twisting the strands of the wire together, as usual. This movement will continue until the rack has passed its entire length over the pinion *l′*, when the projection *p′* will strike the end of the cutting shear-blade Z″, forcing the cutting-edge *s′* thereof against the binding-wire and severing the same. At this time the segment *a′* has passed from its engagement with the pinion *b′*, and the flange *e′* has come in contact with the face *f′*, stopping the revolution of the crank *c′* and the swinging of the sector-frame Y″, and consequently the operation of the twisting mechanism. The wheel A″ will then be in position to act upon the shaft U through the bar B″ and crank C″ and cause the wire-arm to ascend. At the same time the compressor-arm G″ or H″ will be withdrawn, as before described, allowing the bundle which has been bound to be discharged. The rake-arm has now been raised and carried over back of the grain, and is carrying another

bundle forward to the twisting mechanism. During this movement the other segment $a'$ will come in contact with the pinion $b'$, operating the shaft $c'$, and through the crank $g'$ and bar W″ return the swinging sector-frame, bringing the rack $k'$ again in contact with the pinion $l'$, thus reversing the movement of the twister. The opening $t'$ in the blade Z″ allows the binding-wire to swing free during such reverse movement, causing the projection $p'$ to strike the other end, $q'$, of the cutting-blade, and returning the parts to the proper position to again twist and sever the binding-wire for the next bundle, which is bound and discharged as before described. These movements will continue, the wire for each bundle being drawn from the spool by the movement of the wire-arm, as usual.

Motion is given to the shaft O′ by the cord or chain $R^5$, which passes from a suitable pulley $R^4$, on the end of the shaft S′ over the series of pulleys $R^3$ R″ R′. The shaft S′ has its bearings in suitable supports on one of the cross-pieces B of the main frame, and is driven by means of a pinion, T′, so located and arranged as to be driven from the main drive-wheel. In order to take up any slack in the chain or rope $R^5$ the pulleys R″ $R^3$ have their bearings on a sliding plate, U′, which is supported on a curved metal bar, V′, the upper end of which is secured to one of the supporting-bars T.

To the upper end of the sliding plate U′ is secured one end of a short bar or strap, W′, the upper end of which is provided with a set screw or bolt, Z′, which passes through a slot, Y′, in the lower end of a bar or strap, X′, the upper end of which is pivoted to a pin or projection on the frame A′. The slot Y′ allows the strap W′ to be raised or lowered, so as to raise and lower the sliding plate to adapt it to the length of the cord or chain $R^5$. By this means the table N can be swung to any desired position without interfering with or requiring any adjustment of the driving-pulleys and chain, as the plate U′ will slide up and down on its support, keeping the relative position of the pulleys the same, and consequently the chain or cord always taut and in working order.

The binding-wire Q″ is supported upon the spool P″, and passes therefrom over the anti-friction guide-pulley in the end of the bar Z; thence through a suitable opening in the point of the needle to the twister, where its end is held by being coiled around the shank, or in some other suitable manner.

The operation is similar to that of binders having this construction. The grain is dropped upon the stationary table K from the elevator, and swept across the table and upon the plate X and against the binding-wire by the rake-arm. The wire-arm descends, carries the wire around the bundle, where it is twisted together and severed, as before described. The rake-arm in the meantime rises and passes back again to sweep the next bundle into position for the binding.

To prevent the wind from acting upon the grain while being swept across the table, a wind-board, $B^4$, is hinged or pivoted to the table K in such a manner that it can be turned down and form a table for hand-binders. Another board, $B^5$, is also provided, which can be secured to the other end of the table K, by which means the machine can be used for hand-binding in case the

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automatic binder becomes broken, the board $B^5$ having the necessary shape, and being secured in such manner as to form the second table for a second hand-binder.

What I claim as new, and desire to secure by letters patent, is—

1. The rock-shaft E′, provided with the elongated fulcrum *d*, in combination with the rake-arm F′ and a suitable mechanism for operating the rake-arm, whereby the leverage of the arm is increased as it rises and its outer end given a greater elevation, substantially as and for the purpose specified.

2. The rock-shaft E′, provided with the incline *c*, in combination with the rake-arm F′, provided with the double-inclined projection *b*, and a suitable mechanism for operating the arm, for holding the arm down while sweeping across the grain-receiving table, substantially as and for the purpose specified.

3. The rock-shaft, incline *c*, and anti-friction roller $c^3$, in combination with the rake-arm F′, double-inclined projection *b*, and a suitable mechanism for operating the rake-arm, substantially as and for the purpose specified.

4. The rock-shaft E′, provided with the elongated fulcrum *d* and incline *c*, in combination with the rake-arm F′, provided with the double-inclined projection *b*, and a suitable mechanism for operating the arm, substantially as and for the purpose specified.

5. The rake-arm F′, having the rake-tooth G′, and provided with the double incline *b*, and spring-holder I′ for holding the grain down while passing over the table, in combination with the rock-shaft E′, provided with the incline *c*, stationary receiving-table K, and metal plate H′, substantially as and for the purposes described.

6. The rake-arm F′, having the rake-tooth G′, and provided with the double incline *b*, tooth K′, and spring-holder I′, in combination with the rock-shaft E′, having the incline *c*, stationary table K, plate H′, and swinging table N for delivering the grain to the binding mechanism in proper condition for binding, substantially as specified.

7. The table N, plate P, and inclined socket Q, in combination with the support R and cross-bar S, whereby the socket serves the purpose of a pivot for the table and a bearing for the twisting-hook, substantially as specified.

8. The pivotal socket Q, forming a bearing for the twisting-hook, in combination with a swinging table and a twisting-hook, substantially as and for the purpose specified.

9. The shaft U and vibrating binder-arm V, in combination with the crank C″, rod or link D″, spring *w*, crank E″, shaft F″, and arm G″, all constructed and operating substantially as and for the purposes specified.

10. In combination with an automatic grain-binder, the disk A″,

having a cut-away portion or depression, the lever *j*, rod *i*, rock-shaft *h*, rod *g*, the pedal *e*, and the binding mechanism, substantially as and for the purposes described.

11. The pinion N′, provided with the shoulders or stops *u*, in combination with the sliding shaft O′, provided with the pin *t*, the support Q′, and a suitable mechanism for sliding the shaft and stopping the movement of the binding mechanism, substantially as and for the purpose specified.

12. The sliding shaft O′, provided with the pin *t*, and pinion N′, provided with the shoulders *u*, in combination with the pin *s*, head *q*, having the incline *r*, crank *p*, link *o*, bell-crank lever *j k*, roller *m*, wheel A″, having a portion, *n*, cut away, and a mechanism for operating the bell-crank lever by the driver, substantially as and for the purpose set forth.

13. The sliding shaft O′, provided with the pin *t*, and pinion N′, provided with the shoulders *u*, in combination with the pin *s*, head *q*, having the incline *r*, crank *p*, rod *o*, bell-crank lever *j k*, roller *m*, wheel A″, having the portion *n* cut away, rod *i*, rock-shaft *h*, rod *g*, and treadle *e*, substantially as and for the purpose specified.

14. In combination with the driving mechanism of an automatic grain-binder, the driving chain or belt, the sliding plate U′, carrying the pulley-wheels R″ R³, curved bar V′, and connecting-bars W X′ for taking up the slack of the chain or belt, substantially as specified.

15. The wire-spool P″, mounted on the spindle *y′*, in combination with the pivoted yielding lever S″ and the flexible backing or friction-pad O″ for relieving the spool from undue tension of the binding-wire, substantially as and for the purpose specified.

16. The pivoted lever S″, supporting the wire-spool P″, in combinaton with the friction-pad O″, coiled spring V″, cord U″, spool T″, and a tightening nut *x′*, for regulating the amount of yield of the lever, substantially as and for the purpose specified.

17. The flexible tension-pad O″, having fixed supports at its ends, in combination with the wire-spool P″, supported upon the yielding pivoted lever S″ for partly regulating the amount of tension on the binding-wire by the weight of the spool, substantially as and for the purpose specified.

18. The tension-pad O″, wire-spool P″, and pivoted lever S″, in combination with the coiled spring V″, cord U″, and spool T″, all constructed and operating substantially as and for the purposes specified.

19. The sliding cutter Z″, having the cutting-notch *r′*, opening *t′*, and projection *q′*, in combination with the segment F″, having projection *p′*, and with the roller *u′*, twisting-hook, and binder-arm V, substantially as specified.

20. The lever A³, supporting the double-crank shaft *h* for operating the mechanism disconnecting the sliding shaft O′ and pinion

N′, in combination with the pedal *e*, whereby the clutch between the shaft O′ and pinion N′ can be operated by the pedal in
903 whatever position the swinging table may be adjusted, substantially as and for the purpose specified.

21. The combination of the vibrating arm G″, the shaft F″ by which it is supported and moved, provided with the crank E″, a moved part of the machine, and the connecting-link, provided with a spring, so that its length may elastically yield, whereby said vibrating arm will oppose the needle and coact therewith as a compressor and move away to permit the escape of the bundle, substantially as described.

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Witnesses:
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906 UNITED STATES PATENT OFFICE.

GEORGE ESTERLY, of Whitewater, Wisconsin.

*Grain-harvesting Machine.*

Specification forming part of Letters Patent No. 262,026, dated August 1, 1882. Application filed April 3, 1882. (No model.)

To all whom it may concern:

Be it known that I, George Esterly, of Whitewater, in the county of Walworth and State of Wisconsin, have invented certain improvements in grain harvesters and binders, of which the following is a specification.

This invention has reference more particularly to that class of combined harvesting and binding machines wherein the cut grain is elevated from the harvester-platform over the main wheel and delivered in a downward direction upon the table or receiver, where it is bound by the action of automatic devices.

The first part of the invention consists in combining with the surface over which the grain passes to the binding mechanism two vertical endless belts located at opposite ends of the table and adjustable horizontally at their lower ends, for the purpose of acting upon the ends of the grain and delivering the same in a proper manner and form to the binding devices.

Another feature of the invention consists in combining with the harvester and binder-frame an overhead plate, commonly denominated a "deck," attached at one end to the elevator-frame and at the opposite end to the binder-frame, for the purpose of holding the grain down in proper position to be acted upon by the feeding and binding mechanism.

Another feature of the invention consists in peculiar standards adapted to sustain the bearings of the upright rolls which carry the upper ends of the grain-adjusting belts or aprons, and also adapted to receive the journal of the upper elevator-roll. The standards are made with detachable ends to facilitate the removal of the upright adjuster-rolls, this detachable end forming the only feature of novelty claimed herein. As regards the standards, broadly considered, they have been made the subject of a separate application, and are not claimed as of the present invention.

(Here follow diagrams marked pp. 904 & 905.)

Referring to the accompanying drawings, Figure 1 is a perspective view of my improved machine. Fig. 2 is a view of the means for shifting the binder-frame upon the harvester. Fig. 3 is a vertical section through the binding-table and elevator with the shield or deck above the table. Fig. 4 is a side view, showing the manner in which the small belts operating on the end of the grain are sustained.

(No Model.) 2 Sheets—Sheet 1.

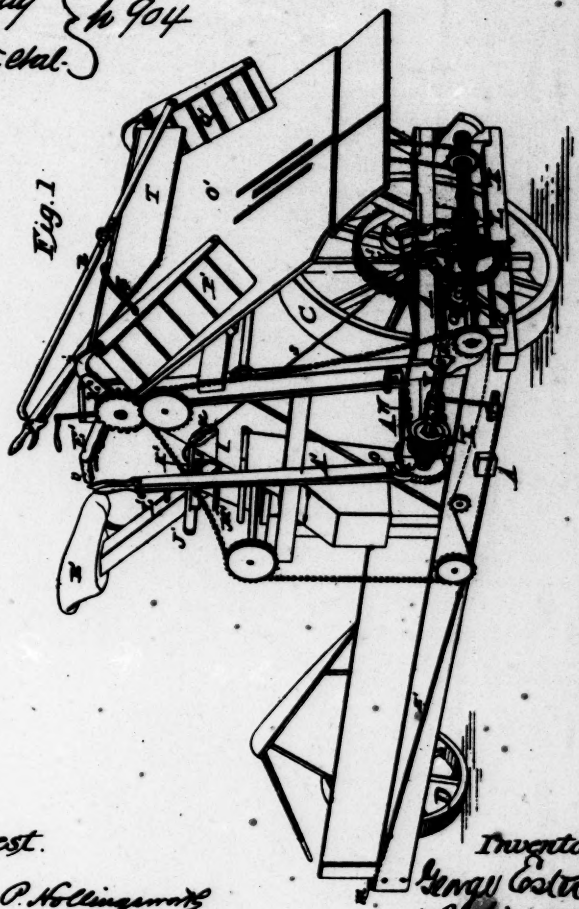
G. ESTERLY.

GRAIN HARVESTING MACHINE.

No. 262,026. Patented Aug. 1, 1882.

No. 322.
Deering
v.
W. H. W. et al.
h 904

Fig. 1



Attest.

Sidney P. Hollingsworth

Newton Wyckoff.

Inventor.

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Philip T. Dodge.

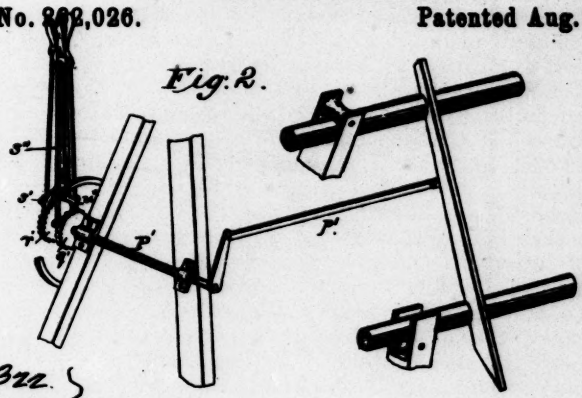
(No Model.) 2 Sheets—Sheet 2.

# G. ESTERLY.

## GRAIN HARVESTING MACHINE.

No. 262,026. Patented Aug. 1, 1882.

Fig. 2.



No. 322
Deering
v.
W. H. W. et al
} p. 905

Fig. 3

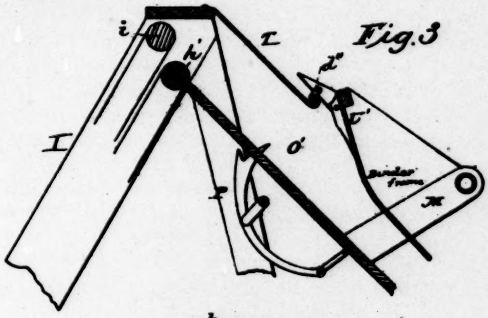
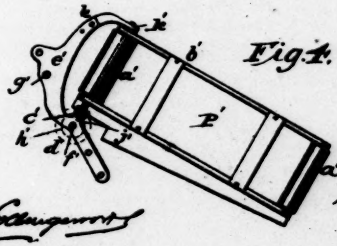


Fig. 4.



Attest.
Sidney P. Hollingsworth
Newton Wyckoff.

Inventor.
George Esterly
By his Attorney
Philip T. Dodge.

In the accompanying drawings I have illustrated my improvements applied to what is commonly known in the art as the "Esterly harvester"—a machine similar in its main features to many others of its class, the machine consisting of a horizontal main frame, A, provided on one side with a horizontal grain-receiving platform sustained at its inner and outer ends, respectively, by means of the traction-wheels C and D. The knife or devices E, by which the grain is cut, are located, as usual, at the front of the platform, as shown. Upon the main frame A there is erected, as usual, an upright elevator-frame, containing two endless elevating belts or aprons, commonly known in the art as "canvases." These belts are sustained at the upper and lower ends of the elevator-frame upon horizontal rolls mounted in the upright frame, as usual. These features form no part of the present invention. On the outer side of the elevator-frame, at or near the top, there is located an inclined board or table, O′, commonly known as a "binding-table," upon which the grain is delivered from the upper ends of the elevator-belts. In connection with this table I arrange in any suitable manner any approved form of grain-binding devices adapted to encircle the gavels upon the table with the binding material, fasten the same, and then discharge the bound bundles. I prefer to employ the form of binding mechanism which is sustained mainly by an overhanging arm of the standard M above the table. The preferred type of machine is the modification of the well-known Appleby machine, represented in my application for letters patent No. 56726, March 29, 1882, to which application reference is made for a detailed description and illustration of the binder and its arrangement in relation to the binding-table.

In order to secure the delivery of the grain to the binding devices in such manner as to cause the application of the band at the middle of the grain regardless of its length, I make use of two approximately-vertical endless belts or aprons, P′ and Q′, located upon opposite ends of the binding-table or grain-receiving board, as shown in Fig. 1, for the purpose of acting upon the ends of the grain and shifting the same endwise, as may be required. These belts
907 are each sustained by approximately-vertical rolls $a'$ and $a''$, located in opposite ends of a frame, $b'$, which frame is sustained by and arranged to swing around the journals of the roll $a'$, this arrangement permitting the lower ends of the frames carrying the belts to be moved horizontally, so that their surfaces will lie at a greater or less angle to the path of the descending grain. The two belts are adjustable independently of each other, so that the space between their lower ends may be varied to suit the length of the grain upon which the machine operates. By properly adjusting the belts the machine is adapted not only to render the ends of the gavel smooth and even, but also to deliver the grain, whether long or short, at any required point upon the table, and to move the grain foward upon the table with equal speed at the two ends, so that it is prevented from swinging laterally or assuming an oblique position upon the table, as it would otherwise be liable to do.

I am aware that it is old to employ stationary adjustable inclined boards at opposite ends of a grain-table to effect the longitudinal adjustment of the grain; but my arrangement of belts differs therefrom in the important particular that the belts control both the longitudinal and the lateral movement of the grain. The belts secure under all circumstances the delivery of the grain squarely and properly to the binding devices. The oblique boards have no such effect.

In order that the attendant may readily adjust the belts as required while occupying his seat upon the machine, I connect with the frame of the forward belt, Q′, a rod or bar, R, extended backward within reach of the driver, and provided near its middle with a series of notches arranged to interlock with a guiding plate or stud upon the main frame. I also connect to the frame of the rear belt, P′, a rod, S, having a hooked upper end, which may be engaged in one or another of a series of holes formed in the top of the elevator-frame at the will of the operator.

Each of the rolls $a'$ is provided on its lower end with a beveled driving-pinion, $c'$, which receives motion from a pinion, $d'$, mounted on the journal of the elevator-roll $h'$, as shown in Figs. 3 and 4. It should be understood that although the drawings show but one of the pinions $d'$, the elevator-roll is provided with two pinions located at opposite ends, one for each of the adjusting-belts.

For the purpose of properly sustaining the rolls $a'$ and of preventing the disengagement of the pinions $c'$ and $d'$, I employ the standards or brackets $e'$, represented in Figs. 1 and 4. These brackets consist each of a base portion adapted to be bolted to the side of the elevator-frame, with bearings $f'$ and $g'$ therein to receive the journals of the two elevator-rolls, and also provided with a bearing to receive the lower journal of the rolls $a'$, and of an upright arm, $k$, forming at its upper end a bearing for the upper journal of the roll $a'$. It will be seen that the standard $e'$ thus serves as a bearing for both the elevator-rolls, and also as a bearing for both journals of the roll $a'$, all of which parts are thus held securely in proper relations to each other. In order to facilitate the removal of the adjusting-belts and their adjuncts, each standard has its upper end, $k'$, made a separate piece from the remainder and bolted thereto, so that it may be readily disconnected when desired. It will of course be understood that when the base portion and the upper end are bolted together they form in effect a single rigid standard. When this end is disconnected it will be seen that the frame $b'$, together with the aprons and supporting-rolls, may be instantly removed. This detachability of the upper end is the only feature claimed as of the present invention.

For the purpose of delivering the grain in a positive manner to the binding mechanism and subjecting it to the required compression, I make use of what are commonly known as "packer-arms," such as represented in my application before referred to. These packer-arms are located beneath the binding-table, as shown at P, Fig. 3, and, ascending intermittently through the same, serve to force the grain downward beneath the binding devices.

In the practical operations of the machine great trouble has arisen, because the mass of grain accumulating upon the table rises over the top of the binding mechanism and fails to pass properly to the packing devices. To avoid this trouble, and also to serve as wind-guards, sheet-metal shields, commonly known as "decks," have been secured to the elevator-frame and extended downward above the binding-table to rest on top of the grain, the shields being left free and disconnected at the lower ends. These shields yield under the pressure of the grain and fail to answer the desired end. I therefore extend the shield T, attached to the harvester as usual, downward, as shown in Fig. 3, and attach the lower edge to the top of the binder-frame U′ or other equivalent device connected with the binder, whereby it is held down securely in place. When the binder is stationary upon the harvester the shield may be bolted firmly to the binder; but if the binder be arranged, as usual, to slide on the harvester the shield will be connected to the binder by any suitable sliding joint. A simple construction is that shown in Fig. 3, in which the lower edge of the shield T is curled upward to form a lip, which engages with a hooked clasp, $d''$, on the binder. It will be seen that a shield applied as above will serve to keep the grain as it is delivered down upon the binding-table in such manner that it will be engaged by the packer-arms P and compelled to pass into the binder.

The binder-frame is made movable forward and backward on the harvester, as usual. For effecting this movement I employ the devices represented in Fig. 2, which will be made the subject of a separate application.

908 The present invention is restricted to those matters and things which are specifically claimed herein, and as regards all other features which may be described and shown, particularly the arrangement of devices for shifting the binder-frame endwise, the right is reserved to make the same the subject of a separate application.

Having thus described my invention, what I claim is—

1. In a combined harvester and binder, the combination of a grain-receiving table, O, and two adjustable endless belts, P′ and Q′, located upon opposite ends of said table to act upon the ends of the grain, substantially as described and shown, whereby a longitudinal adjustment of the grain may be effected and the grain prevented from assuming an oblique position across the table.

2. In a combined harvester and binder, the combination, with the binding-table, of two endless swinging belts located at opposite ends of said table, and means, substantially as described, whereby the lower ends of said belts may be adjusted transversely of the table at will, independently of each other, whereby the grain may be adjusted longitudinally and also adjusted transversely at either end independently of the other.

3. The bracket for sustaining the upper end of the grain-adjuster, constructed, as shown, with bearings for the journals of the adjuster-roll, $a'$, and with the removable upper end, as described and shown, to permit the ready removal of said adjuster-roll.

4. In a grain harvesting and binding machine, the combination, with the grain-elevator and the binding-machine, of the intermediate deck or apron secured at its upper end to the elevator-frame and at its lower end to the binder-frame, substantially as described and shown, whereby the deck is held down in position against the pressure of the inflowing grain.

5. In combination with the harvester-frame and the adjustable binder-frame, the intermediate deck or apron secured rigidly to the elevator-frame and connected with the binder-frame by a sliding connection, substantially as described and shown.

GEORGE ESTERLY.

Witnesses:
W. C. DUVALL.
PHILIP T. DODGE.

(Model.) 3 Sheets—Sheet 1.

# J. E. BUXTON.

## GRAIN BINDER.

No. 248,401 Patented Oct. 18, 1881.

No. 372.
Deering
M. H. W. Wal
4.909

Fig. 1.

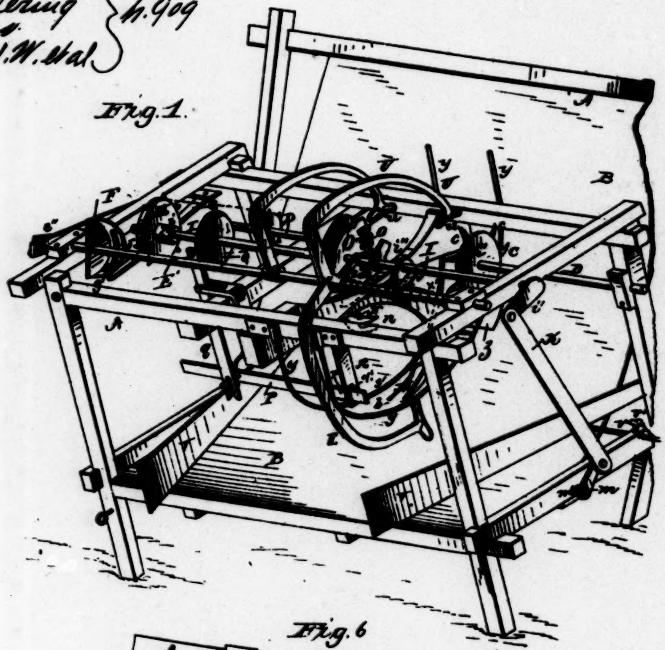
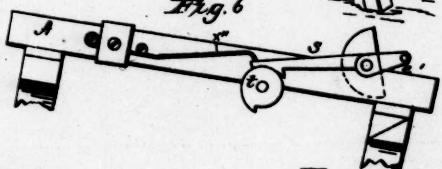


Fig. 6



Witnesses.
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Paige Cornell

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John E. Buxton.
by L. Deane.
his Atty.

(Model.) 3 Sheets—Sheet 2.

J. E. BUXTON.

GRAIN BINDER.

No. 248,401. Patented Oct. 18, 1881.

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p. 910

Fig. 2.

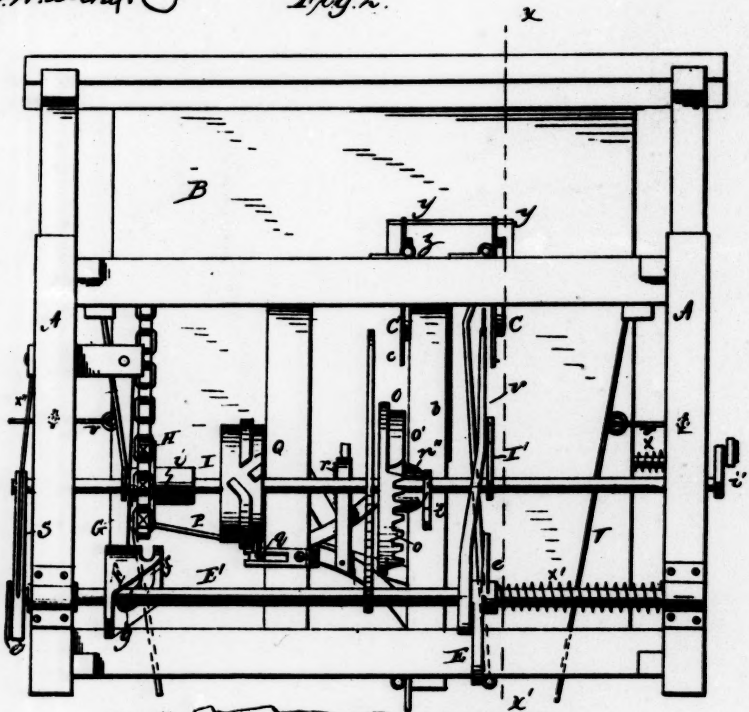
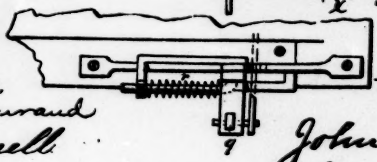



Fig. 7.




Witnesses.
Franck L. Durand
George Cornell

Inventor
John E. Buxton.
by L. Deane
his atty.

(Model.) 3 Sheets—Sheet 3.

# J. E. BUXTON.

## GRAIN BINDER.

No. 248,401. Patented Oct. 18, 1881.

Fig. 3.

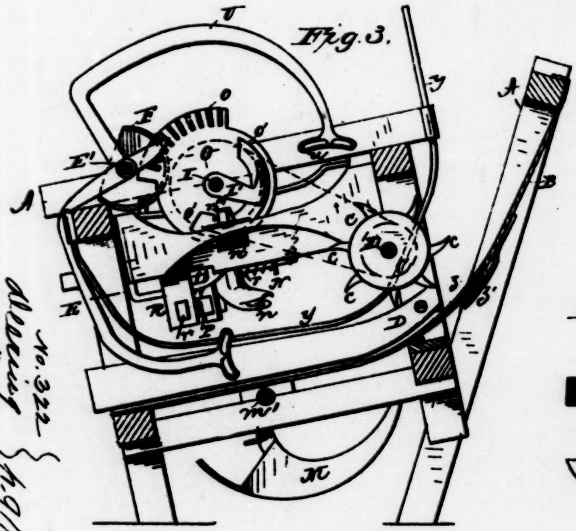
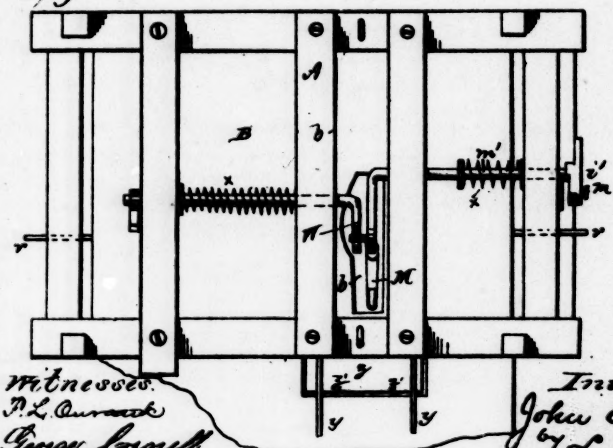


Fig. 5

No. 322
Deering
W. H. Wood.
h. 9/11

Fig. 4.



Witnesses.
P. L. Ouraack
George Cornell

Inventor.
John E. Buxton
by L. Deane
his atty.

912 UNITED STATES PATENT OFFICE.

JOHN E. BUXTON, of Owatonna, Minnesota.

*Grain-binder.*

Specification forming part of Letters Patent No. 248,401, dated October 18, 1881. Application filed April 23, 1881. (Model.)

To all whom it may concern:

Be it known that I, John E. Buxton, a citizen of the United States, residing at Owatonna, in the county of Steele and State of Minnesota, have invented certain new and useful improvements in grain-binders; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

(Here follow diagrams marked pp. 909, 910, & 911.)

Figure 1 is a perspective view of the device. Fig. 2 is a top-plan view. Fig. 3 is a central cross-section on line $x'$ $x'$ of Fig. 2. Fig. 4 is a bottom plan, showing the springs which help actuate the needle and cord moving arm. Fig. 5 is a detail view showing the knotter. Fig. 6 is a detail view showing the connection between shafts E′ and I. Fig. 7 is a detail view, in side elevation, showing some of the operative parts.

The present invention relates to that class of grain-binders known as the "cord" or "twine" binders; and the novelty consists in the detail of the construction and the combination of the parts which compose it, as will now be set forth in detail.

In the accompanying drawings, A denotes any suitable frame or carriage in which the binder is mounted; and B, the usual floor, properly shaped to allow easy passage for the grain from the reception to the delivery end.

The packer-arms *c* are curved projections extending from a disk, C, two or more of which disks are mounted on a horizontal shaft, D, extending from side to side of the machine. Motion is given to this by any suitable power. As the grain is delivered in the machine it is carried forward by the revolving fingers *c* until sufficient has accumulated to form a bundle or gavel, when the mass will press so hard against the compressor-arm E in the rear part of the machine as to force it outward. This communicates motion to the shaft E′ in the upper and rear part, and causes the cam F at its end to turn slowly forward. The pin *g* of the pivoted arm G moves in the slot *f* of said cam, swinging said arm horizontally against the clutch-wheel H on shaft I, which is revolved by proper connection with the main shaft D, and causes it to engage with the part *i* of

the clutch fixed on said shaft, and thus motion is carried by the arm $i'$ and link K to the arm $m$ of the bent shaft $m'$, connected with curved needle-arm M. Thus said arm M is raised up through the slot $b$ in the floor of the machine and pressed against the gavel, forming it into a proper shape and carrying the cord over the bundle. The cord is brought over the revolving knotter N, which has an open-mouthed cutting-notch, $n$, in it for the purpose of holding the cord. This knotter has a pinion, $n'$, on its shank, and is so mounted in the frame that it is actuated by the segment-gear $o$ on the wheel or disk O, which has motion together with the shaft I through the part $i$ and wheel H. The segment-gear is so arranged that it actuates the knotter just as the needle-arm has brought the cord into proper position over the gavel or bundle to be tied. The cord is held between the grasper-bar P and the slotted arm R, and is cut by the V-shaped knife $p$ of the grasper-bar.

The spring $r$ serves to keep the holder normally away from the knotting-hook and to allow it to be moved up slightly toward the hook as the cord is needed in the operation of tying the knot, said movement being caused by the pull on the cord as it is being looped around the knotter. The action of the spring then is to cause the knot to be tied closely and under tension. The holding and cutting bar is slid forward as the knot is completed, so as to release the old end and allow the cord extending from the point of the binder arm to the knotter to fall into the notch in said bar. The bar is then retracted, and the cord is thereby cut on the side toward the knotter and clamped on the other side, ready for another binding operation. While the gavel is being delivered from the machine the raised portion or segmental projection $o'$ on the wheel O bears against the straight side of the semicircular revolving portion $n''$ of the head of the shaft of the knotter N, and thus the knotter is held firmly in position, as now shown in Fig. 3. So soon as this projection $o'$ passes by this side of $n''$ the rack $o$ on the wheel O actuates the pinion $n'$ and revolves the knotter, and when the rack 913 ceases to operate, the arm $i''$ on the shaft comes against the flange $n'''$ on said piece $n''$, and gives it a quarter-turn back, placing it in position to be reversed when the end of said portion $o'$ strikes it and acts on it, as above described. By the retracting motion communicated to the grasper-bar P from the lever $q$, to which it is pivoted, and which is moved by the cam-slotted wheel Q, revolved by shaft I, on which it is fixed, the cord is drawn through the cutter-slot $r'$ in the arm R and severed. Simultaneously, or nearly so, with this act the arm I′ on the shaft I, which has been slowly moving under the projection $e$ of the compressor-arm E, is released therefrom, and motion is communicated to the shaft E′ by the link S, connecting with the crank-arm $e'$ at the end of the shaft, and actuated by the spur-wheel $t$ on the end of the shaft I, engaging with its hooked bent end. This revolution of the shaft E′ causes the arm E to be moved outward and brings the arms U, which project upward and inward from said shaft E′, into the rear of the gavel or bundle, and these then carry it forward and out of the machine. When the two arms throw the bundle

from the machine the knotter turns one-fourth round and the knot is drawn off the knotting-hook, and by means of the sharp edge in the point of knotting-hook the loop or tongue is cut and clears itself from the knotter, so if the sharp edge should not cut the loop the loop will slip out of the front when the knotter is reversed into position at right angles with the needle-arm.

It should be noted that the action of the cam-arm I′ causes at first the compressor-arm to be brought slightly toward the needle-arm, and thus insures the packing together and shaping of the gavel.

The flaring or flanged ends *u* of the delivery-arms U materially aid in the effectual and safe delivery of the bundle from the machine.

At each side of the floor of the machine are spring guide-arms V, which are hinged at the rear end and project out to the front, and are adapted to be set at any desired angle by the rod *v* and screw *v′*. As the gavel comes into the narrowing passage made by these spring-guides the grain is brought lengthwise into even and good shape. When the cam-arm I′ is released from the projection *e* of the compressor-arm, the crank-arm *i*, by its travel, causes the arm *m* beneath the floor of the machine to retract the needle-arm M, which is accordingly carried down through the slot *b* under the machine and into position to be again brought forward and operated as above set forth.

The cord-moving arm W is notched on its end, and acts in conjunction with the needle-arm M in the usual manner. The springs *x* on the shafts of needle-arm and cord-arm W insure the efficiency of their operation.

The guide-rods *y* will serve to keep the grain from getting into the machinery as it passes along from its delivery to the exit end. The hinged plate or leaf *z*, under the packer-wheel C, has springs *z′* to keep it level with the floor of the machine. When this plate is hinged at its lower edge the springs will be so placed as not to throw the upper edge of the plate above the bed or floor. It may sometimes be found advisable to hinge the plate on its upper edge and let the springs act on the lower. The detail of all this construction will readily suggest itself to any one skilled in this class of devices. This plate is of value when wet or matted grain or any clogging substance is passed under the packing-fingers, as it will give sufficiently to prevent any accident to the said fingers or machine.

The spring *x′* on the shaft E serves to press the shaft over, so as to insure the action of the cam F. The spring *x″* causes the arm S to act with certainty.

The ends of the compressor-arm E may be made a little flaring, to insure its efficient action.

The packer C, being made of a solid disk and having the projections or arms *c*, will be found exceedingly strong and durable.

Having thus described my invention, what I consider new, and desire to secure by letters patent, is—

1. The knotter N, having an open-mouthed cutting-notch, *n*, in its lower end, and pinion *n′*, combined with the wheel O, having

gear *o* and projection *o'*, and grasper P, having knife *p*, and bar R, slotted at *r'*, all substantially as and for the purposes set forth.

2. The combination of arms E and U, shaft E', cam F, clutch H, piece *i*, and pivoted arm G, with shaft I, needle-arm M, connected with and operated by said shaft I, substantially as shown and described.

3. In combination with the revolving packer C, a hinged section, *z*, or portion of the floor of the binder provided with a spring, substantially as shown and described.

4. In combination with the floor B, the spring guide-arms V at the side, adjustable by rods *v* and set-screws *v'*, substantially as set forth.

5. The knotter N, having pinion *n'* and the open-mouthed cutting-notch *n*, at its lower end, all substantially as shown and described.

6. The combination of arms E and U, shaft E', cam F, clutch H, piece *i*, pivoted arm G, and shaft I, with grooved wheel Q, lever *q*, grasper P, having knife *p*, bar R, and spring *r*, substantially as set forth.

7. In a grain-binder, the combination of the needle-arm M, compressor-arm E, and discharging-arm U, each operated as described, with a knotter, N, having cutting-notch *n* and pinion *n'*, and grasper P, slotted bar R, spring *r*, wheel Q, and lever *q*, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN E. BUXTON.

Witnesses:
C. L. JONES.
J. W. ANDREWS.

2 Sheets—Sheet 1.

# A. GOODYEAR.

## Grain Binder.

No. 229,396. Patented June 29, 1880.

No. 322, Deering v. W.H.W. et al } p. 914

Fig. 1

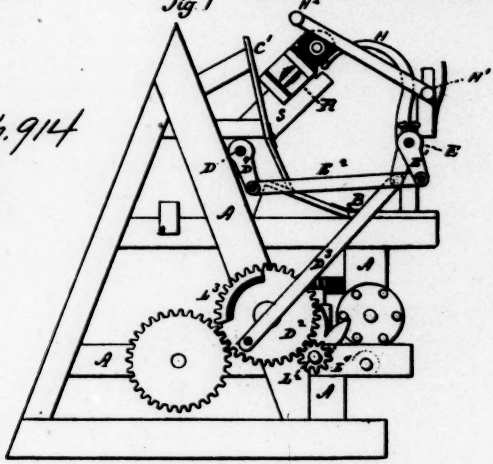
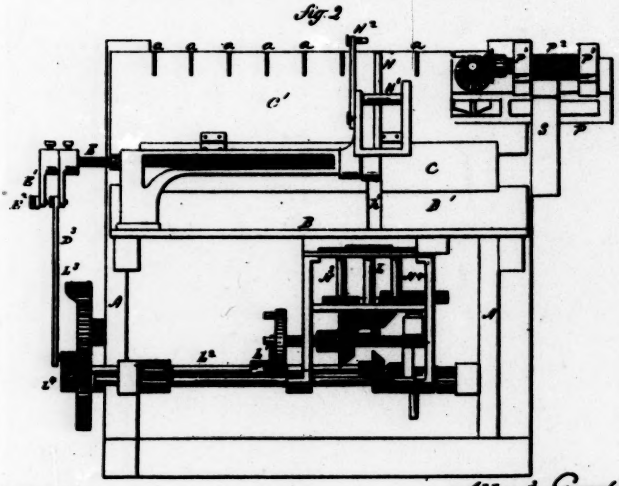


Fig. 2



Witnesses.

J. H. Shumway

H. A. Stern

Albert Goodyear
Inventor.

By Atty.

John E. Earle

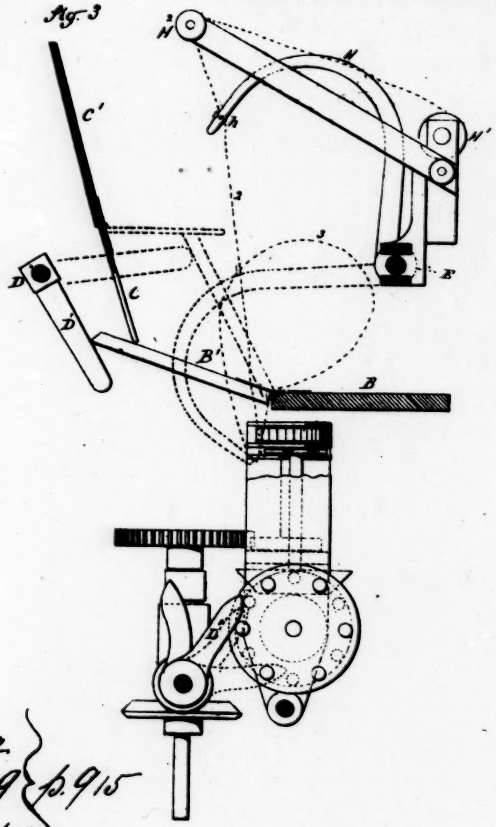
2 Sheets—Sheet 3.

# A. GOODYEAR.

## Grain Binder.

No. 229,396. Patented June 29, 1880.

Fig. 3




No. 322
Deering
W. H. W. et al.
p. 915

Witnesses
J. H. Shumway
[illegible]

Albert Goodyear
Inventor
By Atty.
John E. Earle

916 UNITED STATES PATENT OFFICE.

ALBERT GOODYEAR, of Hamden, Connecticut.

*Grain-binder.*

Specification forming part of Letters Patent No. 229,396, dated June 29, 1880. Application filed October 26, 1878.

To all whom it may concern:

Be it known that I, Albert Goodyear, of Hamden, in the county of New Haven and State of Connecticut, have invented a new improvement in grain-binders; and I do hereby declare the following, when taken in connection with the accompanying drawings and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

(Here follow diagrams marked pp. 914 & 915.)

Figure 1, an end view; Fig. 2, a front or delivery side view; Fig. 3, a sectional view enlarged.

This invention relates to an improvement in grain-binders; and it consists in the combination of mechanism, as hereinafter described, and more particularly recited in the claim.

In illustrating the invention only that part which relates particularly to the binder is shown, the method of delivering grain to the binder from different reapers being too well understood to require full illustration and description in this application.

The carrying-bands from the reaper work through slits *a a* in the back of the platform, so that the grain is carried over the back and dropped to the platform below.

A is the frame which supports the operative mechanism of the binding apparatus; B, the platform on which the grain is delivered to be bound; B′, a second part of the platform, hinged to the first; and C, an auxiliary platform hinged to the back C′, as seen in Fig. 3; D, a longitudinal shaft below the auxiliary platform, and carrying a cam or arm, D′, for operating said hinged part B′ and auxiliary platform C. To the said shaft a rocking movement is imparted through a crank-wheel, $D^2$, from which a pitman, $D^3$, extends up to a second rock-shaft, E, and from an arm, E′, on this second rock-shaft a connection, $E^2$, extends to an arm, $D^4$, on the shaft D, as seen in Fig. 1, so that at each revolution of the crank-wheel $D^2$ the hinged part B′ is turned upward, as seen in broken lines, Fig. 3, carrying with it the auxiliary platform C to the horizontal position indicated in broken lines, Fig. 3 This platform receives the grain as it is delivered over the back C′, and, having received the requisite quantity, drops, allowing the grain thereon to fall onto the principal platform B, then rising again, receives the grain for a second bundle.

On the rock-shaft E and at the point where the band is to be ap-

plied a hook-shaped arm, H, is secured so as to turn with the shaft. H′ represents the reel carrying the wire; $H^2$, a guide through which the wire runs, thence to an eye, *h*, in the end of the hooked arm H.

After the grain has been delivered upon the platform B the rock-shaft E turns, carrying the arm H down back of the grain to be bound through the slot *h′* in the platform to the position indicated in broken lines, Fig. 3.

Before commencing operation or delivering the grain to the platform the wire is run through the eye *h* of the arm H, thence down, and secured in the twisting apparatus below, as indicated by the broken line 2, and this while the arm is in its up position and the platforms down, as seen in Fig. 3. The grain is then delivered between the back C′ and the wire 2. The arm H descending, the wire 2 falls away from before the grain, and the point of the arm H descends on the opposite side of the grain, laying the wire around the bundle, as indicated by the curved broken line 3. The eye of the arm H delivers the wire to the twister, where it is cut off and the end of the main wire secured, but delivering the second end to the twister, already holding the first, and which by its revolution twists those two ends together to secure the wire around the bundle. As the arm descends the hinged part B′ of the platform rises and aids in collecting the grain into bundle form, at the same time raising the auxiliary platform C to receive the grain for another bundle. This done the arm H again rises, leaving the end of the wire held below, the bound bundle is removed, a second quantity is delivered, the arm descends, carrying the wire around to the twister, where it is cut, and the second wire twisted as the first, and so on.

I do not broadly claim the rotary toothed twister, as this may be found in previous patents granted to me for like purposes.

I do not broadly claim an elevated platform for receiving the grain combined with apparatus for placing and securing the
917 band around the bundle, with an adjustable rotary guide for determining the point at which the band is passed around the stalks; but

What I do claim is—

The combination, in a grain-binder, of the principal platform on which the grain is gathered, a second part, B′, hinged forward of said principal platform, and an auxiliary platform hinged to the back, over which the grain passes and above the principal platform, with mechanism, substantially such as described, to impart to the said auxiliary platform and the said hinged part B′ a reciprocating movement to raise the said auxiliary platform to receive the grain, and the said part B′ to aid in gathering the grain on the principal platform, and after the binding of one bundle the said auxiliary platform to deliver the grain to the principal platform for the next bundle, and a binding mechanism to carry the wire around the grain and secure it while on the principal platform, substantially as described.

ALBERT GOODYEAR.

Witnesses:
JOHN E. EARLE.
H. A. KITSON.

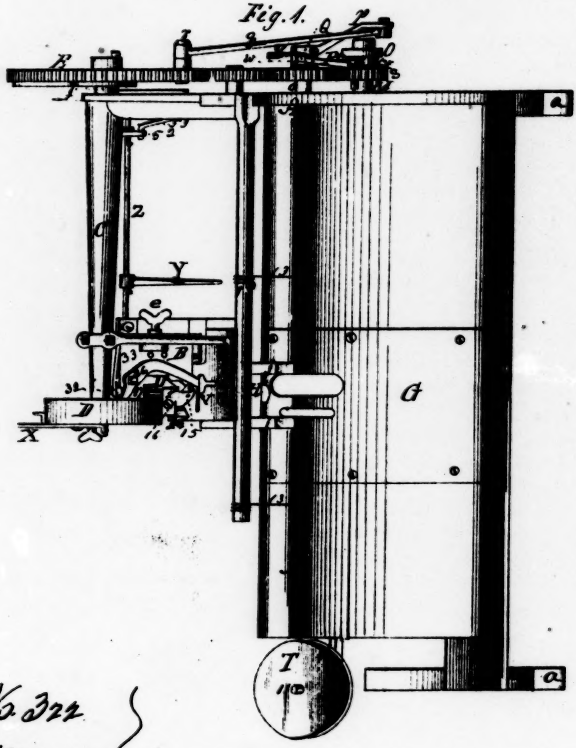
4 Sheets—Sheet 1.

# J. F. APPLEBY.

## Grain-Binding Harvesters.

No. 212,420. Patented Feb. 18, 1879.

Fig. 1.

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Deering
v.
W. H. W. Mal.
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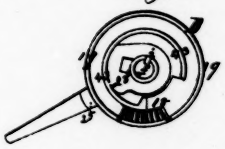
Fig. 6.



Witnesses,
Henry W. Watson
E. Marcellus Gallaher.

Inventor,
John F. Appleby,
By his atty
Jas. Brown.

4 Sheets—Sheet 2.

# J. F. APPLEBY.
## Grain-Binding Harvesters.

**No. 212,420.** **Patented Feb. 18, 1879.**

Fig. 2.

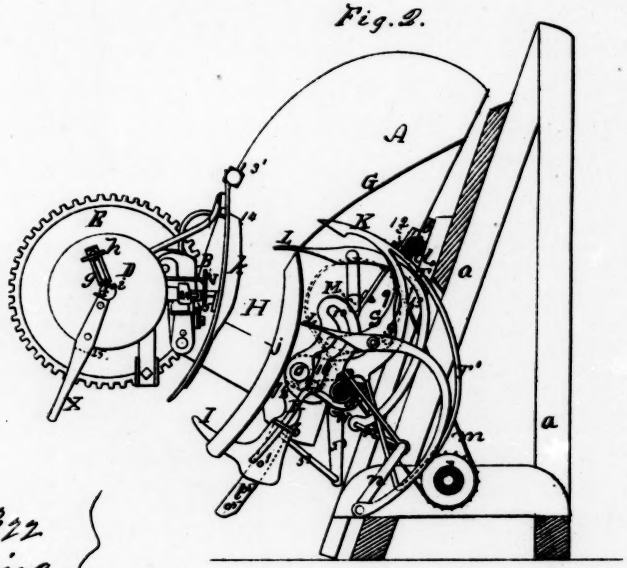



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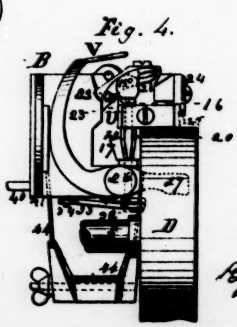
Fig. 4.




Witnesses,
Henry W. Watson
E. Marcellus Gallaher

Inventor,
John F. Appleby,
By his attorney
J. S. Brown

4 Sheets—Sheet 3.

# J. F. APPLEBY.

## Grain-Binding Harvesters.

No. 212,420. Patented Feb. 13, 1879.

No. 322
Deering
vs.
W. H. W. et al
} No. 920

Fig. 3.

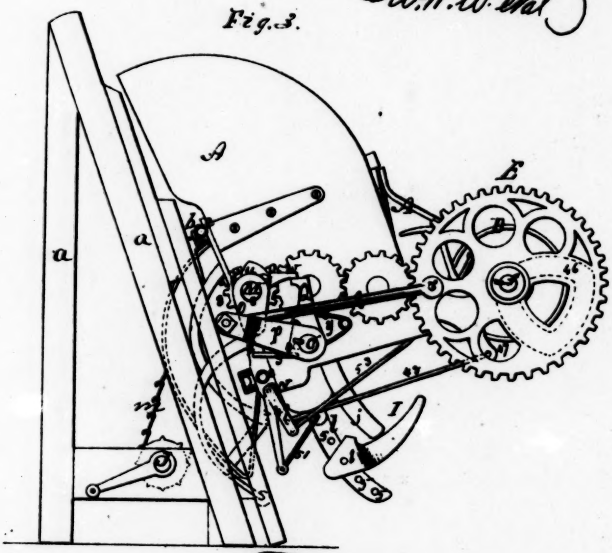
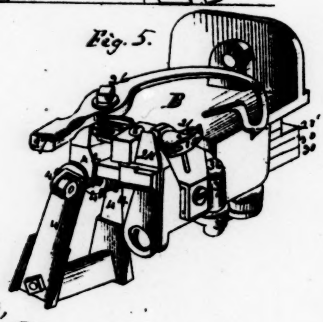



Fig. 5.




Witnesses,
Henry H. Watson
E. Marcellus Gallaher

Inventor,
John F. Appleby.
by his atty.,
J. A. Brown.

4 Sheets—Sheet 4.

# J. F. APPLEBY.
## Grain-Binding Harvesters.

No. 212,420. Patented Feb. 18, 1879.

Fig. 7.

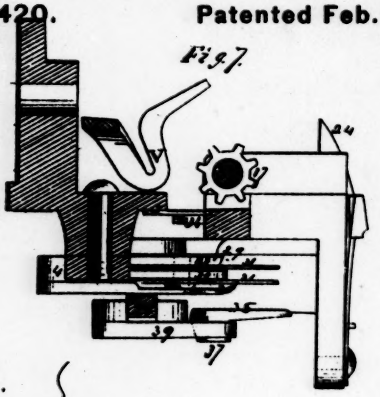



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Fig. 8.

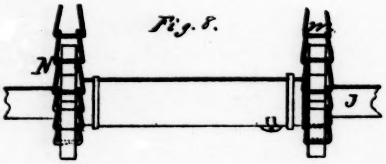
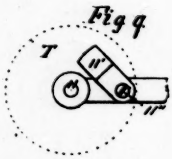



Fig 9




Witnesses,
Henry W. Watson
E. Marcellus Gallaher

Inventor,
John F. Appleby,
By his atty.
J. S. Brown

922 UNITED STATES PATENT OFFICE.

JOHN F. APPLEBY, of West Depere, Wisconsin.

*Improvement in Grain-binding Harvesters.*

Specification forming part of Letters Patent No. 212,420, dated February 18, 1879.

To all whom it may concern:

Be it known that I, John F. Appleby, of West Depere, in the county of Brown and State of Wisconsin, have invented an improved grain-binder for harvesters; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making a part of this specification.

(Here follow diagrams marked pp. 918 to 921, incl.)

Figure 1 being a top view of the entire apparatus composing the grain-binder; Fig. 2, a front view and partial vertical section of the same; Fig. 3, a rear view of the same; Fig. 4, a top view of the band-cord-tying apparatus; Fig. 5, a view in perspective of the said cord-tying apparatus; Fig. 6, a rear view of the cord-tying cam and rack wheel; Fig. 7, a vertical section of the cord-tying apparatus; Fig. 8, a view of a part detached; Fig. 9, a view showing the adjustable friction cord-tension device.

Like letters designate corresponding parts in all of the figures.

In this machine I make use of a cord or line for bands to bind the sheaves of grain, and the apparatus is designed especially therefor, though many of its features are applicable to binders employing wire for bands.

The mechanism composing the binder is mounted in a suitable frame, A, which is supported upon uprights *a a*, secured to the frame of the machine. This binder-frame is distinct and removable from the main frame by drawing it forward; but it is retained in its place by means of buttons *b b*, or their equivalent, closing down upon one of the supporting tubes or bars *c c*, thus holding it down in the supporting pulleys or grooves *d d*, in which it has at the same time an adjustable forward and backward movement, to adapt the binder to both long and short grain.

The cord-tying apparatus B, also, is made readily removable from the binder-frame, so that it may be housed separately, and the fine mechanism composing it may at all times be perfectly protected from the weather and danger of violence and injury. It is preferably secured to the binder-frame by a single hand-screw, *e*, to a flange projecting from a fixed sleeve, C, which forms part of the binder-frame and supports the said cord-tying apparatus, as well as the cam and rack wheel D, which operates the tying mechanism and the driving-wheel E, whereby the shaft *f* of the said cam and rack wheel is

turned, the said shaft reaching through the sleeve for its only bearing. The cam and rack wheel is fastened to the shaft *f* by a pin, *g*, held in place by a thumb-screw, *h*, which screws into the wheel through a slot of the pin long enough to allow the insertion in and withdrawal of the pin from the shaft, thus keeping the pin always attached to the wheel. By tightening the thumb-screw against the pin the latter is securely kept in place as the shaft revolves. A spline, *i*, entering grooves both in the wheel and shaft, couples the two together. The spline is held in the wheel, so that it cannot be lost out, by having heads or side shoulders at its ends catching round the sides of the wheel to prevent its working endwise.

The grain, as fast as it is brought up by the usual elevating-apron, drops upon an inclined board or chute, G, which conducts it to the packing-receptacle H, formed between ways or bars *j j*, by the side of and below the chute-board and ribs *k k*, on a plate, board, or other support next to the cord-tying apparatus, and suitably held in place as shown, or otherwise. At the bottom of the receptacle the grain is supported by fingers I I, pivoted to a holding-bar, *l*, the said fingers also serving to set the binding mechanism in motion when sufficient grain is deposited in the receptacle to form a gavel or bundle of the proper size. So the binding mechanism is automatically stopped after the binding of each sheaf, and is held inactive while the gavel-receptacle is filling.

The entire mechanism of the binder is driven from a driving-shaft, J, of the harvester-machine. The operative movements of the binder thereby produced comprise the packing device, which compacts the grain in the gavel-receptacle, the needle or finger K, which carries and brings into action the binding-cord, and the cord-tying apparatus. For operating the cord-needle, the cord-tying mechanism, and one of the two packing-arms L L, I employ a belt-chain, *m*, or its equivalent, to transfer motion from the shaft J to a transmitting-shaft, M, and another belt-chain, N, communicates motion from the shaft J to a pinion, which drives the other packing-arm. The purpose of this separate movement is to cause the
923 two packing-arms to operate alternately and on opposite sides of the cord-needle K.

The packing-arms L L are located beneath the chute-board G, by which when out of operative range, they are covered, but through slots in which they project, to act upon the grain for compacting it in the receptacle. Their projecting ends are pointed and covered about as shown, or otherwise, to properly perform their functions, which are, first, to project their points out laterally across or nearly across the receptacle, thus separating the grain below from the grain above them, then to descend laterally upon the grain below in the receptacle, thereby compacting it, and then to withdraw from the receptacle beneath the chute-board, to allow more grain to descend into the receptacle; and as one arm recedes from action the other comes into action, separating from above an additional quantity of grain successively and compacting it with that previously received in the receptacle, so that the two arms not only alternately compact additional grain into the gavel-receptacle, but hold it compacted

continually until a sufficient amount is thus gathered to form a sheaf. These movements of the packing-arms are conveniently produced by pivoting each near the middle on a crank-pin constantly revolving by means above specified, or the equivalent thereof, while the lower ends of the arms are guided in the desired way by being pivoted to the free ends, respectively, of pivoted-arms *n n*, as shown, or otherwise, to effect the same or similar movement. These packing arms may keep continually in motion, and do so operate by the mechanism represented in the drawings, but they need operate only while the gavel is forming in the receptacle. The needle, K, also is situated beneath the chute-board G, where it is covered, except when moved out over the receptacle for carrying the binding-cord over the gavel to the tying apparatus. It is mounted on a rock-shaft, *o*, turning in a sleeve or bearings of the binder-frame, and its proper movement is obtained by rocking the said rock-shaft through the space of less than half a circle. This rocking movement is effected by means of an arm, *p*, on the end of a rock-shaft, and a rod, *q*, connecting it with a crank-pin, *r*, on the driving-wheel E of the cord-tying mechanism.

The movements of the needle K and packing-arms L L are arranged and timed so that one of the packing-arms always passes across the receptacle at nearly the same moment as when the needle performs the same movement. As by the organization herein described the needle travels somewhat slower than the packing-arms, the actual motions thereof are thus: The needle enters the grain a little before the packing-arm, which, however, overtakes it at about the moment when the needle reaches the opposite side of the receptacle, and from that moment its downward movement relieves the needle from the contact of the grain below. The effect of this movement is important, since there is thus always a clear separation of the grain below from the grain above, and no loose grain is ever left in the space just below the needle to interfere with the tying-cord, as hereinafter specified.

Motion is communicated to the driving-wheel E from the transmitting-shaft M through two intermediate pinions from a small gear-wheel, *s*, on the said shaft. Since the binding mechanism, which is driven by the driving-wheel E, and has an intermittent movement, is stopped entirely while the gavels are forming, the gearing which connects the shaft M, that turns continually, and the said driving-wheel, are provided with means for coupling and uncoupling at the proper times. I have effected this by having the gear-wheel *s* loose on its shaft M, while the driving-wheel E is not to move, and coupling it to its shaft, when required, by means of an arm, O, fast on the shaft, and provided with a pin or projection, *t*, extending toward the said gear-wheel, on which wheel is pivoted a lever-stop, P, against the short arm *u* of which the said arm projection strikes to couple the gear-wheel to the shaft, but passes outside of it when the said arm of the lever-stop is swung inward. Ordinarily this arm is held outward by a spring, *v*; but when the long arm *w* of the lever-stop strikes the upper end of an arm, Q, which is pivoted upon the rock-shaft *o* of the needle K, the short arm *u* is moved outward

and couples the gear-wheel to the shaft. A spring, *y*, ordinarily keeps the arm Q pressed toward the lever-stop P far enough to cause the arm *w* thereof to rest and bear on its upper end, whereby the *the* spring *v*, pressing against the opposite arm of the lever-stop, is forced back, and the said arm is forced inward far enough to allow the projection *t* of the coupling-arm O to pass around outside of it and cause the gear-wheel 3 to cease to revolve. During this arrangement, therefore, the driving-wheel E, and consequently all the binding mechanism, is at rest. The release of this uncoupling device, to allow the gear-wheel *s* to become coupled to the shaft M and set the binding mechanism in motion, is dependent on the downward pressure of the gavel formed in the receptacle through means substantially as now to be described.

The gavel-supporting fingers I I in the lower part of the receptacle, being pivoted to their sustaining-bar *l*, act as levers upon an extension, *z*, of their pivot-shank beyond the pivot 1, on which they turn. This extension or arm *z* is connected with an arm, R, on a rock-shaft, 2, which extends in bearings back to a position where another arm, 3, thereon can reach the hub or socket of the arm Q, that surrounds the rock-shaft *o*. The said arm 3 is arranged to strike a tooth or projection, 4, on the said hub, so that when the shaft 2 is turned in the proper direction it will cause the arm Q to swing aside, counter to the action of the spring *y*, and thereby release the arm *w* of the lever-stop P, thus allowing the coupling-arm O
924 of the shaft M to couple with the gear-wheel *s*, and so set the binding mechanism in motion. The power of the spring *y* is so graduated in relation to the leverage exerted by the gavel-supporting fingers I I, through the arm R on the rock-shaft 2, that when the pressure produced by the compacted grain in the receptacle in the completion of a gavel of the desired size is exerted on the said supporting-fingers, the said spring will yield and allow the binding mechanism to commence operation; but I provide for a variation of the size of the gavel by means irrespective of the force of the spring *y*, which, when once adjusted to the proper pressure, may remain unchanged. I regulate the size of the gavel by adjusting the supporting-fingers I I up or down on the sustaining-bar *l*, there being a series of holes, 5 5 5, in the said bar through any one of which the pivot 1 may be inserted. The arm R is connected with the extension-arm *z* of the fingers by an eye, 6, on the said extension-arm through which the said arm R extends and may freely slide, it being long enough to still remain in the eye in whatever position the fingers may be placed. The greater leverage exerted on the arm R as the fingers are adjusted downward is nearly counteracted by the increased friction of the extended gavel between its ways. I prefer, however, and arrange to adjust the force of the spring *y* for the special purpose of producing greater or less compactness of the grain in the receptacle, and thus make a closer or looser bound sheaf at pleasure, it being evident that, with the construction and operation above described, the greater the force of the spring *y* the more compact will the gavel become before springing it, and *vice versa;* but it is not desirable to produce very

great compression of the gavel by the packing-arms L L, since they operate with considerable rapidity, and too much work put upon them would require considerable power and make the machine run harder than necessary. I therefore provide a means of compacting the gavel after the full amount of grain is packed into the receptacle, and the needle K has been brought over the gavel, and has separated it from the accumulating grain above.

First. I provide for raising the sustaining-fingers I I as much as necessary for the purpose against the gavel after the needle is brought over it. This is simply and automatically done by suspending the finger-sustaining-bar *l* from an eccentric pivot, 7, on the heel of the needle K or upon its rock-shaft *o*, the pivot being so arranged that as soon as the needle divides the gavel from the grain above and while it is further traveling to its position in the tying apparatus, it lifts the bar *l*, and the fingers I I with it, as far as required, and holds them thus while the operation of tying the band is going on.

Second. The gavel also is partially compressed downward by the needle itself, the under side of which is eccentric to the center of its motion, and acts as a wedge upon the grain. Besides this, there is a compressing-finger, S, on the under side of the needle, pivoted at 8 thereto, its point 9 fitting into a notch or recess in the needle, so that ordinarily its under edge is flush with the under side of the needle and does not interfere with the needle's penetration of the grain in the receptacle. At the proper moment, as the needle approaches the tying apparatus, this finger is caused to swing on its pivot down on the gavel, thus finally compacting the same and holding it thus while tying the band. This operation of the finger is effected by the heel thereof working in a fixed slot, 10, of the proper form to produce the required movement. The finger also acts as a guide to bring the cord into position for tying, as will be seen by the following description of the arrangement of the band-cord and the method of carrying it over the gavel into position for tying.

The cord in quantity is wound upon a spool, T, which turns on a nearly-vertical pin, 11, on the binder-frame, and rests upon a friction-support at the lower end of the pin, so that the weight of the spool and cord produces a certain amount of friction to restrain the unwinding of the cord from the spool, and thereby to create the requisite slight tension thereof. This simple arrangement of the spool is thus made to effect a constant tension, since, when the spool is filled by the cord the leverage thereon by the drawing of the cord is greater than when the spool is nearly empty, and, with parallel effect, the friction caused by the weight of the spool on its support is greatest when the spool is filled with cord and least when it is nearly empty, and this arrangement is sufficient for the purpose.

To render this friction tension fully practicable and sufficiently perfect in its operation under all circumstances, not only is the spool made as light as possible, so that the variation of the friction may be simply proportional to the weight of the cord itself, or nearly so, but I provide for an adjustment of the friction-support

on which the spool rests. To accomplish this, I have invented the device shown in Fig. 9. The friction-support 11′ is attached to the spool-holder at one end of a set-screw, 11″, so that the support may be adjusted from or toward the center of the spool, and thereby produce more or less friction at will.

I do not confine myself to this special mode of adjusting the friction-support.

The cord is carried through the binder-frame from the spool to a position near the heel of the needle, where it passes through an eye, 12; thence through an eye, 13, on the top of the needle itself; thence through a longitudinal tube or passage in the needle to a position near and just below the point thereof, where it comes out, all substantially as represented. When the cord is carried over a gavel by the needle, it extends from this exit at the point of the needle back over and down under the gavel, and thence to
925 the tying apparatus, by which the working end of the cord is continually held.

It is important that the cord should be kept as free as possible from any obstruction or interference, except where it touches the parts required, during the operation of tying, so that it will always be brought to the tying apparatus in the right position, and that there shall be no impediment to the operation of the tying mechanism. For this purpose the finger S of the needle performs an important function, first, by compacting the gavel below the needle, leaving a free space between the needle and the gavel for the cord to lie in, and, second, by having its formed end broad enough to always catch the cord and carry it down to the right position by the side of the terminal part of the cord, ready for tying the two parts together. Besides, there is a guard, T′, on the top of the needle, of a shape concentric with the shaft *o* of the needle, as represented, so that after the needle has penetrated through the grain in the receptacle it holds the grain above at the full height, while the eccentric form of the lower side of the needle, as well as its finger S and the packing-arms L L, presses the gavel down away from it, and the grain which accumulates above the needle and is held between the chute-board and the opposite side-board, as in a hopper, is prevented from tipping down at either end by two light spring-fingers, 13 13, attached to the supporting-bar 13′, reaching across to and pressing lightly against the chute-board. The guard T′ reaches and holds the grain entirely above the points of the packing-arms L L, so that they may continue in motion while the cord is tying without touching the grain above; but as soon as the needle, after the binding of a sheaf is completed, recedes from over the receptacle, the grain above falls a little down upon the spring-fingers 13 13, so that the points of the packing-arms catch hold of a small quantity at each movement, and thus gradually and regularly feed it down into the receptacle; and still further protection is secured for the cord and against entanglement of the grain by the open space given between the needle at one side and the adjacent packing-arm by the two supporting-fingers I I, with space between them, by the two ways *j j*, projecting from the chute-board

or side of the receptacle, with free room between them, and especially by the projecting ribs or ways *k k*, projecting from the side-board, with free room between them. In the spaces between these several parts the cord invariably comes, and is thereby shielded from all obstruction.

Still further provision is made against entanglement of the grain and obstruction of the cord where the needle and its guard meet the ribs or ways *k k*. The upper ends of the ribs terminate abruptly, beginning at the corners 14, at their outer edges, and sloping upward therefrom moderately to the plate, whereto they are attached. The points 14 are so situated that the needle-point and the top of the needle-guard T′, as the needle passes over to the tying apparatus, will come nearly or exactly between them. Thus the dividing-line between the grain below and the grain above coincides at these points, and there is no tendency to carry down the grain which is above, since the needle makes an obtuse angle with the upper ends of the ribs *k k*, and the needle cannot catch any grain below its point upon the ribs to cause entanglement there.

The tying apparatus automatically ties the cord in a complete knot, cuts the cord beyond the knot, and holds the end of the cord securely after a knot is tied until the next sheaf is ready to be bound, and also releases one end and seizes and retains the next end during the operation of tying, so that the cord end is never loose, and the cord, once started in the machine, requires no further attention, except to connect new spools of cord to the last ends of the previous spools before they are run entirely out of the machine.

The complete apparatus comprises a tier proper, provided with an improved knotting-hook and means of operating the same, an improved cord-severing device, a device for seizing and holding the cord before severing and for releasing the end already held at the proper moment, a special device for guiding the two folds of the cord upon the tier, and particularly for drawing the band from the knotting-hook as the knotting is completed, and improved means of operating these several functional parts.

All the operative parts of the tying apparatus are actuated by a single revolution of the cam and rack wheel D, which is brought into action at the proper moment when the needle has brought the cord or string into position for tying.

First. As to the construction and operation of the tier proper, U, and its knotting-hook 15, which extends laterally from the end of the tier-shaft 16, the said shaft is mounted in bearings close by the inner face of the cam and rack wheel in a nearly horizontal position directed toward the gavel-receptacle. When at rest it lies with the knotting-hook 15, also nearly horizontal, projecting laterally from the tier-shaft, so that when the needle passes over the tying apparatus it lays the cord directly over and across the said knotting-hook. The operation of tying the knot is performed with this hook by a single revolution of the tier-shaft in its bearings, thus bringing it into position again for the next tying. This revolution of the tier is produced by means of a pinion, 17, on its shaft gearing

intermittently into a segmental rack, 18, on the cam and rack wheel D, there being as many teeth, less one, on the rack as on the pinion. The rack occupies only a small portion of the circumference of the cam and rack wheel, the remainder of the circle being a simple rim or flange, 19, projecting as far as or further than the teeth of the rack, against which rim or flange a plain face, 20, notched into the pinion, or attached to it, slides, and thereby holds the pinion from turning while this part of the wheel is passing by it. The rim or flange being intermit-ed where the rack 18 is as soon as one end thereof comes to the pinion the rack gears into the same, causing it to turn until its rear end passes over and from the pinion. Upon the knotting-hook 15 is a finger, 21, pivoted thereto, as shown, so that the tip of the finger can close against the point of the hook, and thereby serve to seize the cord at the right time and hold it, and again release the cord when required. The other end of this finger has a cam-projection, preferably provided with an anti-friction roller, 22, which, when it is desired to open or separate the finger from the hook-point, strikes a stationary cam, 23, situated on or near the adjacent bearing of the tier-shaft in such a position as to perform the said office at the proper time and keep the parts separated as long as required. The finger is closed against the point of the hook by spring-pressure from a spring-cam, 24, attached to the frame of the tying apparatus in a suitable position, as shown.

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Thus constructed and organized the tier operates thus: As the needle descends into position for the tying, it brings the body-fold of the cord over the knotting-hook and lays it there side by side with the end fold of the cord to be tied thereto. Then at the required moment the tier begins to be turned on its shaft, first bringing upward the knotting-hook, with two folds of the cord around it. The knotting-hook continues to turn over, and then downward, and before it reaches a vertically-downward position the cam-roller 22 on the finger strikes the cam 23, and separates the finger from the point of the knotting-hook, so that when the hook is brought in line with the continuation of the cords below the knotting-hook, the hook-point goes by one side and the finger by the other side of the said cord-folds. Directly after the two parts of the cord are thus caught between the hook and finger the cam-roller 22, having left the cam 23, is brought against the spring-cam 24, which causes the finger and hook to pinch the cord with sufficient pressure to hold the same for completing the tying. Then the knotting-hook, having made a complete revolution and returned to its first position, the guide V, which had previously directed and helped to hold the two folds of the cord over the knotting-hook, has imparted to it a rearward movement, carrying with it laterally the cord far enough to draw the cord-loop from the knotting-hook around the folds of the cord held between the hook and finger, and thus, since the tension on the cord continues, the band is tied in a complete knot. The finger continues to clamp the ends of the band-cord, being held thus by the action of the spring-cam, until released by means of a projection, 25, on the

cam and rack wheel D, which, as the said wheel turns, is brought into contact with the said spring-cam, and forces it away from the heel of the finger, thereby allowing the band to be withdrawn entirely from the knotting-hook.

The cord-guide V is a sort of hook with sides terminating at the bottom in a nearly V-shaped notch, thereby holding the cord brought therein in the proper line. It is pivoted on a vertical pin, 26, to the frame of the tying apparatus, and its motion for casting off the cord-loop from the knotting-hook is produced by a heel projection, 27, thereof being struck by a cam projection, 28, on the hub or other part on the shaft of the cam and rack wheel.

The cord severing and seizing and hold devices, operating in connection with the knotting hook, are of peculiar construction. The results effected thereby are to hold the end of the cord securely till the needle brings the next fold of the cord into position for tying the band, to seize the next body fold of the cord before the end is set free, and to securely fasten in position and sever the said succeeding fold from the cord required for the band immediately after setting the cord free, there being no time in which the successive ends, as severed from the band, are not securely retained.

The severing-knife 28′, acting by a shearing cut in connection with a stationary cutting-edge, 29, and one, two, or more movable cord-holding plates, 30, acting in connection with stationary plates 31, to hold the successive ends of the cord, after severing each band therefrom, have a sliding or reciprocating movement to perform their functions communicated from or in time with the tier. As represented, the movement is produced by means of a crank or cam, 32, on the tier-shaft, and a connecting-rod, 33, extending therefrom to a pivoted vibratory lever, 34, the other end of which lever is connected with the said knives and cord-holding plates. The arrangement of this mechanism is such that the crank has thrown and holds the lever backward to its farthest extent when the knotting-hook is in its resting position, thereby retaining the holding-plates closed between or in alternating positions with the stationary plates, between which movable and stationary plates the cord is held by several bends around the successive edges thereof, and thus securely retained. This device holds the end of the cord while the gavels are forming and until the needle comes over again for binding another sheaf. Then, before the last end is released and another fold of the cord is laid in to be cut off, provision is made for retaining the cord end, when set free, until the knotting of the band is completed, since the end must be set free and retained, so as to yield until the knotting is effected; also, it is requisite or best to bring the last fold of the cord under control and into position before setting the end free. For these purposes two hooks or fingers, 35 and 36, are employed, one situated above and the other below the severing-knife and holding-plates. These hooks are attached
928 to rock-shaft 37, and a reciprocating movement is communicated to them on this shaft by means of a sliding bar or rod, 38, and connecting-rod 39, connecting the bar and a crank-pin on one of the hooks or on their shaft. The bar 38 is secured to a slid-

ing rod, 40, having a backward-and-forward movement from and toward the cam and rack wheel in suitable bearings or ways, 41 42. The rod, with the bar, is kept forced against the face of the cam and rack wheel or a cam, 43, thereon, by a spring or springs, 44, in which position the said hooks or fingers are held close upon the cord, since most of the time the rod bears against the cam and the hooks are lifted; but when it is time to seize and hold the folds of the cord, just after the needle has come down into position, the forward end of the rod or an anti-friction pulley, 45, thereon, passes off from the cam, and is forced against the face of the wheel by the spring 44, thereby causing the lower hook, 35, to catch the last fold of the cord and the upper hook, 36, to seize the same fold and the preceding or end fold of the cord. The last fold of the cord is thereby pressed upon or against the holding-plates and severing-knife, so that as soon as the said plates and knife recede the end enters into position in front thereof, whereby, when they again come forward, the plates seize and hold the cord and the knife severs it, the part of the cord held by the plates being that next to the needle. As the holding-plates recede to admit the last fold of the cord, they release the end previously held. This released end is one end of the band just beginning to be tied, and it, as well as the end of the band last severed by the knife from the main cord, is retained in place by the upper hook, 36, until the knotting-hook has turned and made the loop for the knot, and has seized the two folds of the cord thus held. The retention of the cords being by spring-pressure, they are thus allowed to be drawn out somewhat, if necessary, in forming the knot above. Then the rod 40 rides upon the cam 43 and releases the ends of the cord, which, therefore, are free to yield in the completion of the knot. The end which was previously held by the holding-plates, and consequently is a little longer than the end last severed by the knife, forms a bow in the tied knot. There is no waste of cord, only what is necessary to form a secure knot being used.

After the sheaf is bound, and before the needle has entirely receded and the binding mechanism is again at rest, the bound sheaf is discharged from the receptacle. First, the supporting-fingers I I are moved from under the receptacle to allow the removal of the sheaf downward. This movement is effected by means of a cam or cam-groove, 46, (shown by dotted lines in Fig. 3,) on or in the forward face of the driving-wheel E, (or of a cam-wheel on its shaft,) in which groove slides a stud on a crank-lever, 47, pivoted to the frame, and connected by a rod, 48, with a crank-arm, 49, on a rock-shaft, W, upon the other end of which is another crank-arm, 50, that is connected by a rod, 51, with the pivoted sustaining-bar *l* of the said supporting-fingers. The arrangement of the several parts is such that at the proper time the bar *l* is swung back far enough to withdraw the supporting-fingers from beneath the receptacle, leaving the sheaf free to drop, and, directly after the discharge of the sheaf, to return the supporting-fingers to the position beneath the receptacle to sustain the next forming gavel therein. As soon as the supporting-fingers are removed from beneath the

receptacle, an arm, X, projecting from the cam and rack wheel or from its shaft, in the revolution thereof, strikes the top of the bound sheaf and causes it to be discharged from the receptacle upon the ground.

To insure the discharge of the sheaf properly, another arm, Y, at the rear of the tying apparatus, acts simultaneously with the arm X upon the other end of the sheaf. This arm may be attached to the shaft of the cam and rack wheel to receive its proper motion; but I have represented it as attached to a rock-shaft, Z, extending back to the rear end of the binder, and there having a crank-arm, 52, connected by a rod, 53, to the crank-arm 49 on the rock-shaft W. The arrangement is such that the vibration of the said arm 49, for the purpose herein set forth, will cause the arm Y to move down upon the sheaf simultaneously with the arm X.

What I claim as my invention, and desire to secure by letters patent, is—

1. Retaining-buttons *b b*, in combination with the sustaining-bars *c c* of the frame A and the grooved pulleys *d d*, substantially as and for the purpose herein specified.

2. The combination of the slotted pin *g* and set-screw *h* with the cam and rack wheel D and shaft *f*, substantially as and for the purpose herein specified.

3. In combination with a gavel-receptacle, a finger or fingers, I I, at the bottom thereof, having first an upward movement to compress the gavel before binding, then backward to permit the discharge of the bound sheaf, then downward and forward to its original position, substantially as and for the purpose herein specified.

4. The combination of the needle K and packing-arms L L, arranged to operate in such a manner that one of the packing-arms shall have a movement simultaneous with the needle through the grain in the receptacle, substantially as and for the purpose herein specified.

5. In combination with a pivoted supporting-bar, *l*, the gavel-supporting fingers I I, pivoted to and adjustable on the said supporting-bar, substantially as and for the purpose herein specified.

6. In combination with the gavel-receptacle of a self-binding harvester, two or more grain-compacting arms, L L, acting alternately or successively, and each having a continuous curved movement, first forward across the receptacle to separate a quantity of grain, then downward in the receptacle to pack the grain thus separated, then outward from the receptacle, and upward to complete the movement, substantially as and for the purpose herein specified.

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7. The combination of a cog-wheel, *s*, loose upon a driving or transmitting shaft, M, through which motion is communicated to the driving mechanism of the needle and cord-tying apparatus, a fixed coupling arm, O, upon the said shaft, and a lever-stop, P, pivoted to the said cog-wheel, and actuated by a spring, to automatically bring it into the path of the said coupling-arm, for the pur-

pose of coupling the cog-wheel to its shaft at a stated time, substantially as herein specified.

8. The combination of the sustaining-bar *l*, the supporting fingers I I, adjustably pivoted thereto, and the needle-arm K, having a vibrating heel, from which the said bar is suspended by a pin or pivot, 7, substantially as and for the purpose herein specified.

9. In combination with the coupling-arm O on the shaft M and spring-lever stop P on the cog-wheel *s*, an arm, Q, mounted on the needle rock-shaft, and provided with a spring, *y*, to press it forward, and thereby to catch and hold the lever-stop P, so as to prevent the coupling of the said cog-wheel to its shaft while the gavel is forming in the receptacle, substantially as herein specified.

10. The combination of the stopping-arm Q and its spring *y* with the supporting-fingers I I of the gavel-receptacle, so arranged that when the receptacle is filled to produce a certain pressure on the said fingers the spring *y* will yield, and the arm Q will be moved away from the lever-stop P, and allow the cog-wheel *s* to be coupled to its shaft and start the movement of the needle and band-tying mechanism, substantially as herein specified.

11. The combination of the pivoted bar *l*, supporting fingers I I, adjustable thereon, arm B, rock-shaft 2, arm 3, and arm Q, provided with a projection, 4, for the arm 3 to strike, substantially as and for the purpose herein specified.

12. In combination with the cord-spool T, variably weighted by the cord, a friction-tension device, 11′, receiving the cord-weighted spool thereon and adjustable toward or from the center of the said spool, substantially as and for the purpose herein specified.

13. In combination with the needle K, a compressing-finger, S, shutting closely into the under side thereof, and near the close of the forward movement of the same having a positive movement therefrom directly upon the grain of the gavel, substantially as and for the purpose herein specified.

14. Projecting ways or ribs *j j* and *k k*, at opposite sides of the gavel-receptacle, for further shielding the binding-cord from obstruction and allowing its motions to be free, substantially as herein specified.

15. In combination with the needle having a concentric guard, the ribs *k k*, at one side of the receptacle, constructed to have angles where the point of the needle enters between them and to form an obtuse angle with the needle at the top, substantially as and for the purpose herein specified.

16. A guard, T′, on the needle, concentric with the needle's motion, for keeping the grain above at the proper height away from the reciprocating packing-arms while the sheaf is binding, substantially as herein specified.

17. In combination with the spring-cam 24 and tier U, a projection, 25, on the cam and rack wheel, for forcing aside the said cam at the required moment, substantially as and for the purpose herein specified.

18. The hooks or fingers 35 36, in combination with the holding-plates 31, for seizing and bringing into position the cord-folds and

temporarily holding the same when severed from the main cord, substantially as herein specified.

19. The combination of the spring 44, bars 38 and 39, rock-shaft 37, hooks 35 and 36, sliding rod 41, and a cam, 40, on the cam and rack wheel D, substantially as and for the purpose herein specified.

20. The combination of the sustaining-bar *l*, having a reciprocating movement, and the supporting-fingers I I, having a swinging movement on the said sustaining-bar, substantially as and for the purpose herein specified.

21. The combination of the revolving arm X and vibrating arm Y, substantially as and for the purpose herein specified.

Specification signed by me this 19th day of October, 1876.

JOHN F. APPLEBY.

Witnesses:
J. S. BROWN.
JNO. D. PATTEN.

931 H. R.

Filed May 13th, 1889.

OSCAR B. HILLIS, *Clerk.*

"DEFENDANTS' EXHIBIT GORDON CIRCULAR."

*The J. H. Gordon Self-binding Harvester.*

The inventor has several years been interested in perfecting a machine to cut and bind grain automatically, and during the past year has succeeded in producing a machine that has worked to his satisfaction and that of the farmers who have used it and all who have seen it operate.

It is now offered with confidence as a demonstrated success. The binder is simple in construction; all its parts are open to view; its mechanism can readily be understood by any practical farmer.

The grain is elevated as on the Marsh harvester, received by compressing arms or packers, bound securely into sheaves with a wire band and dropped to the ground, all by automatic machinery. Only one person is required to drive and manage the machine.

The attention of farmers and dealers is requested to this machine, assured an examination will convince them that it will do all that is claimed for it. A large number of farmers and others have seen it work in the harvest field this season and are unanimous in their commendations. It has been tried in all kinds of grain and has invariably worked well. Below are some statements for verification, of which reference may be had to the persons named. A few newspaper notices are also appended.

Chicago, Ill., September, 1874.

932 Edward McElroy, of Kalamazoo, Michigan, purchased one of the machines this year and cut with it 85 acres of wheat, averaging more than ten acres per day. The binder gave him no trouble whatever. He employed no extra help during harvest. Mr.

McElroy says he prefers wire to straw brands—the bundles stay together better. Mrs. McElroy says she has never known so easy a harvest in her department. Mr. McElroy had his machine on trial, but sent the pay after one day's use, and is enthusiastic in its praise.

James McNabb, of Kalamazoo, Mich., cut and bound 50 acres this year. He has given his order for a machine next year. He says he finds the bundles better bound with wire than straw, and prefers wire bands, and that the machine does cleaner work and shells less, especially in overripe grain, than when done in the ordinary way, the saving being sufficient to pay the expense of the wire.

Redpath Brothers, of Kalamazoo, used this machine to cut 18 or 20 acres of oats, and pronounced it the most perfect harvesting machine they have ever seen.

James Taylor, of Kalamazoo, had two binders used on his place. His grain was too ripe to bind by hand. He says the work was done perfectly.

The machine cut 30 acres for Mr. Van Patten, of Steward, Kendall county, Illinois. He was equally well pleased with its work.

It also cut 25 acres for Daniel Delany, of Steward, Kendall county, Illinois, to his satisfaction. The grain was badly crinkled and leaned badly one way, and was very ripe and could not be bound by hand.

933 Fifteen acres were also cut for Ray & Gardner, of Rochelle Illinois. A large number of farmers and others saw the binder at Steward and Rochelle. We may especially refer inquiries to Wesley Steward, Esq., of Steward, and Messers. May & Moure, of Rochelle, who gave the working of the machine careful attention, and, we think, will certify all we claim for it.

*Extract from the Western Rural, Chicago, Ill.*

On July 15th a trial of two Gordon machines took place a short distance out of Kalamazoo in the presence of several hundred citizens. The result demonstrated that with them two men and two teams could do the work of twelve men and four horses. The harvesters worked at a rapid rate of speed without missing a single bundle. This wheat was "dead ripe" and could not be handled by ordinary reapers, yet so perfect was its working that no loss of grain accrued. It is simple in its construction and so efficient that it has not missed one bundle in a thousand, and then only from the breaking of the wire. But three of the machine have yet been produced: the two above mentioned and the one purchased by an extensive farmer in the vicinity. This one cut 85 acres of wheat at an average of a little over ten acres a day. The inventor states his intention of shortly exhibiting his machine to Illinois, Wisconsin, and Minnesota farmers.

*From the Rochelle Register, Rochelle County, Ill., Aug.* 15, 1874.

Gordon's self-binder.—Gordon's self-binding harvester has been at work some days in the vicinity of Rochelle and Steward, having

cut some 75 acres of grain on exhibition. One man rides the machine to drive, and by a very simple device worked with the
934 foot he regulates the size of the bundles. The machine is without doubt destined to supersede all present harvesters. It works to perfection. It binds every bundle tight. It does not leave a straw unbound upon the field, and one man and two horses are all that are required. It reduces the labor of harvesting to the very minimum. There is no complicated machinery, but what there is moves slowly and in not likely to get out of order. Hundreds of farmers have followed it through the fields during the last ten days, and all are loud in its praise. Some of the most important manufacturers in the West came to Steward to watch its operations, among whom were Cyrus H. McCormick, Messrs. Lewis Steward, Gammon, and others. They each and all endorse it. We can enter into no explanation of its working parts; it must be seen to be fully appreciated. Many farmers in this vicinity have filed orders for them, and the entire lot manufactured will be sold long before the time for delivery. The introduction of these machines into the grain fields of the Northwest will do more than any other one thing to make farming not only profitable but pleasant.

*Extract from Kalamazoo Daily Telegraph, July* 16, 1874.

The Gordon self-binding harvester—Its work on Mr. Taylor's farm—No more raking and binding—How one machine does all the work.—Yesterday and the day before a great many hundred people visited the farm of Mr. James Taylor, about a mile west of Burdick street, to see the working of the "Gordon self-binding harvester." The work was done in the field immediately adjoining the road, estimated to contain about twenty-five acres of wheat. Two harvesters were used and certainly performed wonders.

935 After the machine had finished Mr. Taylor's wheat yesterday they were taken to Miller's farm, on the Portage road, to cut a piece of wheat owned by Mr. P. S. Waite, and have been working there today. Yesterday each harvester cut and bound about an acre an hour, notwithstanding a perfect gale of wind was blowing all the time, doing the work as fast as the horses could draw it around the field.

The average amount of grain that can be cut and bound by this machine in a day is from ten to twelve acres. On the farm of Mr. McElroy, in the township of Texas, as many as fifteen acres have been cut in a day. It may be well to mention in this connection that Mr. McElroy, having seen the harvester at work, was so pleased with it that he bought one immediately, and is now, having cut his 85 acres of grain with it (averaging 10 acres a day), so well pleased with his purchase that he would not part with it for three times its price if he could not get another.

The work of binding is done much better by this machine than it could possibly be done by hand; not a straw is lost, but everything is taken within the embrace of the binding arm and enclosed within a wire binder. The wheat is apt to shell less, also, than

when bound by hand, as it is held more firmly and steadily by the machine than it can be by any other means.

On Mr. Taylor's farm, as well as in the field where the harvesters have been working today, the wheat was so dry and brittle that it would have been utterly impossible to make binders from the straw, and if it had not been for the machine the farmers would have been obliged to draw in their grain as best they could without binding.

936 All these are the advantages of the "Gordon self-binding harvester," which we saw the other day going around the field of wheat on Mr. Taylor's farm at a much greater speed than at which an ordinary reaper is driven, cutting the grain, which, before it left the machine, was tied into as perfect sheaves as we ever saw. It seemed impossible to believe that one machine could perform the work of so many men, doing such different sorts of work; and yet the process is simple.

The grain is taken from the cutter by an endless canvas belt, and is then raised over an elevator, which is built somewhat as follows: The outer surface is of wood, placed at an angle of about forty-five degrees to the platform of the cutter, and on the right of the driver. The wood is slotted, and through the slots come the teeth of a revolving rake, which carry the grain to the top of the elevator and then draw off, leaving the grain to fall on a second slotted platform, which is also inclined, and where a perfect division of the grain is made. Through the slots of this platform come a second series of revolving teeth, called "packers," which pack the grain in a compact form for binding, in a receptacle, where it is held firmly by a wire passing from a spool through and eye in the iron binding arm, the tension of which can be so arranged as to bind the grain with any degree of tightness that may be wanted. When sufficient grain to make a bundle is in the receptacle the binding arm clasps it, the wire is twisted and cut off, and the bundle drops to the ground. The size of the bundle is regulated by the driver with his foot.

We have spoken of the division of the grain. This is a very important consideration, for if the grain were allowed to come tumbling over into the receptacle it would interfere materially

937 with the work of the binding arm. To obviate any such difficulty, the coming grain is held back by this machine until the binding of the sheaf already made up is accomplished.

In such a season as the present it will be readily seen how invaluable this harvester would be to our farmers. With it one man can do the work of six, and does it as the six could never think of doing it. Altogether it is a great invention and has turned out a perfect success. The farmers who saw it working on Mr. Taylor's farm were all greatly pleased with it. We ourselves heard many enthusiastic encomiums upon its merits, and almost all who know it thoroughly have declared their intention of purchasing as soon as the manufacture of the harvesters is commenced, some having even given orders for machines already.

938 Whereas letters patent of the United States No. 272,598 were issued to John F. Steward February 20, 1883, for an improvement in grain-binders; and

Whereas William Deering, of Chicago, Illinois, is desirous of acquiring an interest in said letters patent:

Now, therefore, know all men by these presents that for and in consideration of one dollar and other good and valuable consideration to me in hand paid, the receipt whereof is hereby acknowledged, I, the said John F. Steward, have sold and assigned and hereby sell and assign to the said William Deering all my right, title, and interest in and to said letters patent No. 272,598 and in and to all claims or rights of actions arising out of or accruing from past infringements thereof, the same to be held and enjoyed by the said William Deering, his heirs and assigns, to the full end of the term of said letters patent and all extensions thereof as fully and entirely as they would have been held by me if this assignment and sale had not been made.

In witness whereof I have hereunto set my hand and seal this 8th day of June, A. D. 1885.

JOHN F. STEWARD. [SEAL.]

939 & 940 Received for record April 8th, 1881, and recorded in Liber L 26, page 240, of Transfers of Patents.

In testimony whereof I have caused the seal of the Patent Office to be hereunto affixed.

[PATENT OFFICE SEAL.] E. M. MARBLE,
*Commissioner.*

Ex'd: F. C. T.

Whereas I, William F. Olin, of Chicago, county of Cook, State of Illinois, did obtain letters patent of the United States for improvements in harvesters, which letters patent are numbered 223,812 and bear date the 27th day of January, one thousand eight hundred and eighty; and

Whereas I am now sole owner of said patent and of all rights under the same; and

Whereas William Deering, of Chicago, county of Cook, and State of Illinois, is desirous of acquiring the entire interest in the same:

Now, therefore, to all whom it may concern be it known that for and in consideration of the sum of one dollar to me in hand paid and other good and valuable consideration, the receipt of which is hereby acknowledged, I, the said William F. Olin, have sold, assigned, transferred, and set over and by these presents do sell, assign, transfer, and set over unto said William Deering all the right, title, and interest whatsoever which I have in and to the said improvement in harvesters and in and to the letters patent therefor aforesaid, the same to be held and enjoyed by the said William Deering for his own use and behoof and for the use and behoof of his legal representatives to the full end of the term for which said letters patent are *as* may be granted as fully and entirely as the

same would have been held and enjoyed by me had this assignment and sale not been made.

In testimony whereof I have hereunto set my hand and affixed my seal this fourth day of April, A. D. 1881.

WILLIAM F. OLIN. [SEAL.]

In presence of—

L. H. JEWETT, Witness.
J. F. STEWARD, Witness.

941 Supreme Court of the United States.

WILLIAM DEERING
*vs.*
THE WINONA HARVESTER WORKS *et al.* } No. 322.

Appeal from the circuit court of the United States for the district of Minnesota.

Whereas by order of court the evidence contained in the record of the case of William Deering *vs.* The McCormick Harvesting Machine Company, pending in this court, was heretofore transferred to and ordered to be printed in the record in this cause; and

Whereas much of the testimony so transferred and ordered to be printed in this cause related to claims 3, 4, 9, and 10 of the Steward patent 272,598, which were not involved in the suit against the above appellees:

Now, therefore, to avoid the necessity of printing in this cause matter relating to such claims 3, 4, 9, and 10, it is hereby agreed by and between the above parties respectively that in printing the record herein the clerk may and he is requested to omit from such printing all of the following matter contained in the record transferred from the suit against the McCormick Company—the reference to pages being to the original pages of the printed matter so transferred—to wit:

Beginning on page 10 with the words "Counsel for complainant offers in evidence," in the 10th line of the complainant's record,
942 and ending with the words "transfers of patents," in the 18th line of the same page.

Beginning with Q. 3, in line 4 of page 11 of the complainant's record, and ending with the words "Steward model 191,264," in the 20th line of the same page.

Beginning with the words "Counsel for complainant offers in evidence," in the 25th line of page 20 of the complainant's record, and ending with the words "sued on in this cause," in the 29th line of the same page.

Beginning with Q. 19, in the 4th line of the 24th page of the complainant's record, and ending with the bottom of page 26.

Beginning with the words "Witness at this point states," in the 17th line of page 384 of the complainant's record, and ending with the words "affect the claims mentioned," in the 15th line of the 397th page.

Beginning with the words "Cross-examination by Mr. Parkinson," in the 16th line of the 425th page of complainant's record, and ending with the words "forming part of my deposition," in the 18th line of the 428th page.

Beginning at the commencement of page 50 of the defendants' record and ending at the end of the 58th page.

Beginning with the words "Also copy of illustrated circular," in the 7th line from the bottom of page 322 of the defendants' record, and ending with the words "Defendants' Exhibit Deering Cut," on page 323.

Beginning with Q. 6, in the 7th line from the bottom of page 324 of the defendants' record, and ending with the words "I have," in the 10th line from the bottom of page 325.

943 Beginning with Q. 23, in the 6th line from the top of page 379 of the defendants' record, and ending with the words "further from the binding cord," in the 11th line from the top of page 394.

Beginning with the words "William R. Baker," in the 8th line from the bottom of page 401 of defendants' record, and ending with the words "I don't think we do," in the first line of page 417.

Beginning with the words "Redirect examination," in the 7th line from the top of page 423 of the defendants' record, and ending with the first line on page 424.

Beginning with the words "Henry E. Pridmore," in the 15th line from the bottom of page 425 of the defendants' record, and ending with the words "I decline to answer," in the 4th line from the bottom of the 477th page.

Beginning with the words "Counsel for defendants," in the 4th line from the top of page 482 of the defendants' record, and ending with the words "Patent Office model," in the 12th line from the top of page 482.

Beginning at the top of page 483 of the defendants' record and ending with page 522.

Beginning with the words "Depositions of witnesses," on page 523 of defendants' record, and ending with the words "Justice of the peace," on page 533.

It is further stipulated and agreed that in case either party hereafter find that relevant matter has been omitted or struck out the same may be supplied and printed at the expense of appellant and form a part of the record herein.

EPHRAIM BANNING,
THOMAS A. BANNING,
*Solicitors for Appellant.*
PHILIP C. DYRENFORTH,
*Solicitor for Appellees.*

944 [Endorsed:] Case No. 14,369. Supreme Court U. S., October term, 1893. Term No., 322. Wm. Deering, app't, *vs.* The Winona Harvester Works *et al.* Stipulation to omit parts of record in printing. Filed Jan'y 16, 1894.

[Endorsed:] Chancery. No. —. United States circuit court, district of Minnesota. William Deering *vs.* The Winona Harvester Works *et al.* Chancery files No. —.

Endorsed on cover: Case No. 14,369. Minnesota C. C. U. S. No. 322. William Deering, appellant, *vs.* The Winona Harvester Works, C. L. Bonner, J. J. Randall, Caspar F. Search, and C. H. Porter. Filed October 21, 1890.

# STIPULATION AND ADDITION TO RECORD.

## SUPREME COURT OF THE UNITED STATES.

**OCTOBER TERM, 1894.**

No. 54.

WILLIAM DEERING, APPELLANT,

*vs.*

THE WINONA HARVESTER WORKS ET AL.

APPEAL FROM THE CIRCUIT COURT OF THE UNITED STATES FOR THE DISTRICT OF MINNESOTA.

**FILED SEPTEMBER 1, 1894.**

(14,369.)

(14,369.)

# SUPREME COURT OF THE UNITED STATES.

## OCTOBER TERM, 1894.

No. 54.

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WILLIAM DEERING, APPELLANT,

*vs.*

THE WINONA HARVESTER WORKS ET AL.

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APPEAL FROM THE CIRCUIT COURT OF THE UNITED STATES FOR THE DISTRICT OF MINNESOTA.

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JUDD & DETWEILER, PRINTERS, WASHINGTON, D. C., OCTOBER 1, 1894.

1 Supreme Court of the United States.

WILLIAM DEERING, Appellant,
*vs.*
THE WINONA HARVESTER WORKS *et al.*, Appellees.

In accordance with the stipulations on page 79 and page 605 of the printed record herein it is agreed that the following portions of the testimony certified up in the transcript from the court below and inadvertently omitted in the stipulation designating the parts of such transcript that should be printed may now be printed by the clerk and be treated in all respects the same as if printed under the stipulation designating the parts of the transcript to be printed.

THOMAS A. BANNING,
*Solicitor for Appellant.*
PHILIP C. DYRENFORTH,
*Solicitor for Defendants.*

2 *From Mr. Bates' Deposition.*

Q. 21. Look at defendants' binder before you and state your opinion as to whether or not it contains the combinations described and claimed in the 20th and 21st claims of the patent sued on, giving your reasons for any opinions you may express.

A. In my opinion the defendants' binder does contain the combinations set forth in the Steward patent 272,598, and claimed in the twentieth and twenty-first claims thereof.

My reasons for this opinion are as follows:

The twentieth claim of the Steward patent is in the following words: "The combination, in a grain-binder, of moving butt-adjusting mechanism, and the board $d^1$, substantially as described."

As set forth in the patent, the moving butt-adjusting mechanism consists of an endless belt moving on pulleys set in a frame at right angles to that portion of the machine over which the grain is passing when acted upon by this device. Its object, as I understand it, is to act upon the butts of the grain so as to move short grain backwards and deliver it centrally to the binder, and also to convey the butts forward in their path, so that they will keep pace with the heads. One end of this device is pivoted to the machine, and the other is capable of swinging to adjust the device to grain of different lengths. To the swinging end of this moving butt-adjuster is pivoted a board marked $d^1$, the purpose of which is to prevent the grain forming the gavel from working or jarring forward whilst the gavel is accumulating.

3 It is the combination of these two devices, to wit, the moving butt-adjuster and the stationary butt-retainer or board $d^1$, which constitutes the combination of the twentieth claim.

Turning to the Winona machine I find in it a moving butt-adjusting mechanism of the identical construction and operation of

that in the Steward patent. Pivoted to the end of this butt-adjuster in the Winona machine is a board which constitutes a butt-retainer and prevents the grain forming the gavel from working or jarring forward whilst the gavel is accumulating.

These two parts in the Winona machine are of the same identical form and construction as in the Steward patent and are combined together in the same way.

In fact, the identity is such as to suggest that the Winona machine was constructed from the Steward drawing or *vice versa*.

For these reasons I say that the Winona machine contains the Steward invention as defined in the twentieth claim of his patent, 272, 598.

The twenty-first claim of the Steward patent is in the following words: "The combination of the swinging butt-adjuster, the arms $d^2$, $d^3$, and $d^4$, and the board $d^1$, pivoted to the swinging butt-adjuster substantially as described."

I have just explained the swinging butt-adjuster and the board $d^1$ in speaking of the twentieth claim. The arms $d^2$, $d^3$, and $d^4$, together with the frame of the swinging adjuster, constitute a parallelogram, whose function is to keep the board $d^1$ parallel to the edge of the chute or at right angles to the gavel, whatever its position may be. To this end the arm $d^2$ is secured to the board $d^1$, so that the two are as one piece; the arm $d^3$ is rigi[illegible] or as one piece
4 with the machine; the arm $d^4$ with the frame $d$ of the butt-adjuster joins said parts $d^2$ and $d^3$, so that these remain parallel, and thus all positions of the board $d^1$ are parallel to each other and at right angles to the gavel.

In the Winona machine there are, as already explained the swinging butt-adjuster and the board corresponding to $d^1$; there is also in the Winona machine a parallelogram which retains the board parallel in all its positions and at right angles to the gavel; this parallelogram in the Winona machine is composed of the frame of the butt-adjuster, the top or ridge of the machine which corresponds to Steward's $d^3$, a lever composed of flat bar iron which corresponds to Steward's $d^4$, and a piece of round bar iron which corresponds to Steward's $d^2$; this latter is connected to the butt-retaining board, so that the two are as one piece and the detaining board is kept in its proper position. This round bar in the Winona machine is passed through two eyes on the machine for some reason, probably to overcome the effect of the bend at the end of the bar. These eyes are not necessary to the operation of the device. It would operate better without them, especially if the rod were straight and if they were omitted the butt-retaining board would keep its position at right angles to the gavel by reason of the parallelogram exactly as it does in the Steward patent.

Therefore as I find in the Winona machine a swinging butt-adjuster, a butt-retaining board pivoted to it, and parts forming a parallelogram and corresponding exactly to Steward's arms $d^2$, $d^3$, and $d^4$, I say that the Winona machine contains Steward's invention, as set out in the twenty-first claim of this patent No. 272,598.

5 *From Mr. Steward's Deposition.*

Q. 4. Here is a model which I offer in evidence as Complainant's Exhibit Stewart 1880 Model. Please state when this model was made, under whose direction it was made, and all about it.

A. The model was made by Christopher Bruescher, and completed in February, 1881; I think it was begun, however, in December, 1880. I made some experiments during that time, and think it was not completed for some time after it was begun. The spring was a rubber band, which has decayed and only remains in part. It was made strictly under my direction and was intended to illustrate the idea which I had been working on for several years.

Q. 5. Here are some marks on the bottom board of the model. Who put them there and what are they?

A. They are the words March 10th, 1881, the word March being in short-hand. This date I wrote at the time I put the model away for safekeeping.

Q. 6. How far does the model, as it now appears before us, correspond to its construction and condition at the time you finished it, about February, 1881?

A. No changes whatever, except that a little connection pin is lost, for which I have substituted a domestic pin and a piece of the rubber spring.

6 *From Defendants' Testimony.*

"GOTTHILF SCHLESENER, witness produced on behalf of defendants, being duly sworn, on oath deposes and says, in answer to questions by Mr. PARKINSON, as follows:

Q. 1. State your name, age, residence, and occupation.

A. My name is Gotthilf Schlesener; my age, 42 years. I live in Union township, Dickinson county, Kansas, on a farm about five miles northeast of Hope. I am a farmer.

Q. 2. Are you acquainted with Gottlieb Heller, who resides near Dillon, this county; and, if so, how long have you known him?

A. I have known him about 16 years.

Q. 3. Did you visit Mr. Heller's farm in 1878 or 1879; and, if so, did you see his harvesting machine and grain-binder?

A. Yes (as to both parts of the questions).

Q. 4. When did you see his machine?

A. I saw it both years I visited his farm, in 1878 and 1879.

Q. 5. Was your attention called at either of these visits to any additions or attachments which had been placed upon the machine after Mr. Heller purchased it, and, if so, by whom.

A. He got a board on his binder with a spring on it. I don't know what kind of a spring was on it, whether it was round or flat; I could not tell. He made the same kind of a board on mine. He made it of sheet iron on mine and without a spring.

Q. 6. Please explain just where and how the board you speak of was attached to Mr. Heller's machine.

A. He put it on with little hinges. I could not tell what kind of hinges it was. He had it fastened on above and a spring on behind.

7 Q. 7. About what size was this board?

A. It was a thin board about two feet long—about six or seven inches wide.

Q. 8. What position did it occupy in reference to the binder deck?

A. Its edge was close down to the binder and it extended from the top downward and inward. It was at the end where the heads of the grain fell.

Q. 9. Who called your attention to this board, if any one?

A. Mr. Heller.

Q. 10. What, if anything, did he tell you about it?

A. He said it holds the short grain back, so that it comes together in a bundle.

Q. 11. Was it in 1878 or 1879 he told you this?

A. It was in both years.

Q. 12. What, if anything, was there on the other end of the binder of Mr. Heller's machine for guiding the butts of the grain?

A. He had a short elevator on it. He got a board on his machine, close to the elevator, down below it, so as to hold the grain from falling down. He put that on my machine; he bolted it on; he bolted it at the top of the elevator through an iron arm. There was only one bolt, but the iron arm was thick enough so it could not bend. It goes forward and back with the elevator.

Q. 13. How long was this iron arm and was it straight or curved?

A. I could not tell how long it was; it was not straight. It was bent so as to adapt it to the curvature of the surface of the deck, so as to fill out the hole in the deck.

8 Q. 14. Did the board stand in line with the elevator?

A. It did at first, although I bent it a little back. I liked that way a little better.

Q. 15. How was the board upon Mr. Heller's machine attached to the elevator?

A. He nailed it on his elevator to his machine.

Q. 16. Was it nailed fast?

A. Yes.

Q. 17. Why did not Mr. Heller or yourself put a spring on the wind board of your machine?

A. He had no spring--he didn't make a spring on mine. I do not know why he did not put one on mine. Mine was tight on the binder and could not move.

Q. 18. Did you see more than one kind of extension to the elevator or butt-adjuster on Mr. Heller's machine?

A. No; I did not see any more.

Q. 19. Was the extension to the butt-adjuster on your machine the same as on the Heller machine except that one was fastened with bolts and the other with nails?

A. That was the only difference, except mine was of sheet iron and his a wooden board. His was nailed and mine was bolted.

Q. 20. What kind of a butt-adjuster did your machine have and also the Heller machine?

A. A small elevator, with canvas running around. They were both the same way.

Cross-examination by Mr. BANNING:

X Q. 21. How often did you see Mr. Heller's machine we
9 have been talking about before you bought your own?

A. I did not see it before I bought mine.

X Q. 22. Which bought his machine first, you or Mr. Heller?

A. Mr. Heller bought his one year and I bought mine the next year. I bought in 1879.

X Q. 23. Then you never saw these devices you have been talking about on Heller's machine in 1878?

A. No; not in 1878, but in 1879 and 1880.

X Q. 24. How many times did you see them in 1879 or afterwards?

A. Just once in each year, when I got my repairs from him.

X Q. 25. Did he tell you that the butt-adjuster extension which he put on your machine was the same as the one which he had always used in his own machine?

A. No; his was not the same; his was of wood and mine of iron; they would both do for the same work.

X Q. 26. Did he ever tell you of his ever having used any other kind of a butt-adjuster extension or of one put on in any other way than by bolting or nailing, so as to make it rigid and stiff with the butt-adjuster itself?

A. No; not on this end of the binder.

X Q. 27. You say he put yours on in 1879?

A. Yes; that is right.

X Q. 28. Did he then tell you that he had used one put on the same way the year before, *i. e.*, 1878?

A. Yes; he told me that he put it on his machine. His was of wood and mine of iron. He told me he nailed his on and mine was bolted.

X Q 29. But he never told you that he put one on his
10 machine in 1878 in any other way than by nailing it fast to the butt-adjuster itself, did he?

A. No; not on that end of the binder.

X Q. 30. Did he talk with you much about these attachments to his machine when you were getting repairs or at other times?

A. Yes; for the behind side, and lots of times about both sides.

X Q. 31. Then he talked with you a good many times about the extension which he nailed to his butt-adjuster, as well as about the board at the other end of the binder?

A. Yes.

X Q. 32. As I understand you, all these extensions to the butt-adjuster which Mr. Heller told you about or which you ever saw or used, say, before 1882 or later were secured rigidly to the adjuster itself, so as to always move in line with it, is this correct?

A. Yes.

X Q. 33. Are you positive that you saw a spring connected with the board at the other end of the binder, which we have generally referred to and which I will hereafter call a wind board? I speak of what you saw on Heller's machine.

A. Yes; I saw a board with a spring on Mr. Heller's machine; a round or flat spring, I could not tell.

X Q. 34. What was the object of that spring? What did it do?

A. It held the board close to the grain.

X Q. 35. When and where did you see it?

A. I saw it two times in 1878 or '79. I never saw it in use.

X Q. 36. How long was the spring and how was it located and secured?

A. I could not tell how long it was. I could not tell you. I do not know how it was put on, with wood screws or not.

11 X Q. 37. Do you know whether it was a wire spring or not?

A. I do not know whether it was wire or steel. I cannot tell.

X Q. 38. Do you know whether it was a spiral spring or not?

A. No; it was not that kind.

X Q. 39. You really know very little about it, nothing in fact, except what Mr. Heller told you; is not this the case?

A. I think that is all.

X Q. 40. How close do you live to Mr. Heller?

A. About 7 or 8 miles. We are acquaintances and on good terms. We like each other.

Redirect examination by Mr. PARKINSON:

R. D. Q. 41. How long did you continue to use your machine with the wind board and butter attachment?

A. I used it three years. I did not like the wind board behind and took it off. It was tight on my machine. I took it off the second year and throwed it away. The other part attached to the elevator I used as long as I used the machine.

R. D. Q. 42. Just how was Mr. Heller's butter extension nailed to the butt extension?

A. It was nailed to the side of the butt-adjuster.

GOTTHILF SCHLESENER.

Witness CHARLES F. KNAPP, being duly sworn, on oath deposes and says, in answer to questions of Mr. PARKINSON, as follows:

Q. 1. Please state your name, age, residence, and occupation.

A. My name is Charles F. Knapp; age, 29; reside in Liberty township, Dickinson county, Kansas, about 14 miles northeast of Hope. I am a farmer and have been for myself for four years.

Q. 2. Have you or your father a grain-binder; and, if so, in what year did you purchase your first grain-binder?

12 A. Yes; my father owned one. He purchased it in 1879—that is, the binder. He purchased the machine in 1878. I then lived with my father and operated the machine until I left

home in the spring of 1883; at which time I changed the machine for a new one, paying the difference.

Q. 3. What kind of a machine was it and what kind of a butt-adjuster did it have? I refer to the first machine.

A. It was a Beloit machine and it had a rolling canvas.

Q. 4. Was this butt-adjuster adjustable as to position?

A. It was adjustable by a lever or iron handle. The handle had notches and the notches worked on a casting backward or forward on top of the machine, and in this way the butt-adjuster—the lower end of the butt-adjuster—could be moved in and out.

Q. 5. Was there a board of any kind at the other end of the binder deck when you got the machine?

A. No, sir; there was not—no wind board, I mean.

Q. 6. Did you afterwards put on a wind board? If so, when did you put it on, and you may describe it.

A. I put it on in 1879; about some time in June—I could not say exactly—or the first days of July. I put on a piece of siding a little over a foot long—a wedge about 4 inches long and about 2½ inches thick. I placed it behind the board at the upper end and bolted it on. The siding was about six inches wide and about ¼ inch thick on one edge and about ½ inch thick on other edge.

Q. 7. What position did this piece of siding occupy with reference to the binder deck?

A. I put the board's edge on the binder deck with the lower end toward the grain—that is, the board was slanting.

13 Q. 8. Was the lower end of the board fastened in any way?

A. No, sir.

Q. 9. Why did you put this board upon the machine?

A. To make the straddle grain run nearer to the binder to get it into a bundle. By straddle grain I mean the grain that gets straddled in the back end of the elevator. When the grain is short it will spread apart and can't get into the bundle.

Q. 10. Did you use the machine with the board on it in the harvest of 1879?

A. Yes, sir; I cut somewhere near 90 acres with the board on.

Q. 11. Have you used it since with the board on; and, if so, how many seasons?

A. I used it as long as I had a machine—to 1883.

Cross-examination by Mr. BANNING:

X Q. 12. Was that wind board which you say you put on in 1879 adjustable so as to adapt it to grain of different lengths; if so, to what extent and in what way was it adjustable?

A. It wasn't adjustable, only it was loose on the lower end; that could spring some.

X Q. 13. How much could the lower end spring?

A. I do not know. I never tried it.

X Q. 14. What was the wedge behind the board used for and how was it secured or held in place?

A. The wedge was there to keep the board in its place at the

upper end. It was bolted on through the wedge. The bolt passed through the back board of the binder, and also through the wedge and wind board. In this way the upper end of the wind board was held rigidly.

14 X Q. 15. But the lower end, or, indeed, the whole wind board, for that matter, was held rigidly in place so as not to be capable of being moved backward or forward to adjust it to grain of different length. Was this not the case?

A. As I said before, the lower end was loose, and I think it would spring some, as much as any thin board could. It was not otherwise adjustable.

X Q. 16. Of what material or kind of wood was that wind board?

A. It was soft pine; an old piece of pretty thin, common house siding.

X Q. 17. Did you find that wind board satisfactory in cutting all kinds of grain?

A. I know this much: I put it for middling grain, so that the long grain would slip through and save some of the short too.

X Q. 18. Could it have been used successfully either in very long or very short grain?

A. I have used it that way, but, of course, I could not say that it would do as good work in very short grain as in long grain; but as it was put on it gave pretty good satisfaction.

X Q. 19. Who suggested to you to put this wind board on?

A. I put this on myself; my own idea.

Re-examination by Mr. PARKINSON:

R. Q. 21. From whom did your father purchase the first machine?

A. Of Rubin Bros.

CHARLES F. KNAPP.

Witness JOHN STROTH, being duly sworn, on oath deposes and says, in answer to questions of Mr. PARKINSON, as follows:

Q. 1. Please state your name, age, residence, and occupation.

A. My name is John Stroth; age, 39; residence, Lyon
15 township, Dickinson county, Kansas, about 3½ miles southeast of Hope; I am a farmer.

Q. 2. Are you acquainted with Gottlieb Heller, who lives on a farm near Dillon, Kansas; and, if so, how long have you known him?

A. Yes; have known him about ten years.

Q. 3. Did you see Mr. Heller's grain-binder some years ago; and, if so, when did you first see it?

A. Yes; I saw the machine in June, 1879, on his place.

Q. 4. How did you happen to see it?

A. I went over to get repairs for my machine and he showed it to me.

Q. 5. Did he call your attention to any attachments upon his machine; and, if so, what were they?

A. Yes; he put a board on behind on the binder, a sheet-iron board.

Q. 6. About what was the size of the board?

A. I believe it was a little over 2 feet long and 8 or 10 inches wide.

Q. 7. How was it fastened to the machine?

A. I cannot tell exactly how it was. I believe it had hinges on, but I cannot say exactly.

Q. 8. How did the board stand with reference to the binder deck?

A. It was fastened on top; it stood down loose at the lower end.

Q. 9. Which way did it point?

A. It run down, slanting inward.

Q. 10. Could the lower end be moved in or out towards the ends of the grain?

A. Yes.

Q. 11. How?

A. It got a spring it moved.

Q. 12. Was it fastened stiffly or loosely at the top?

A. Well, I don't know exactly; I can't tell.

Q. 13. Did you ever see his machine operated?

A. No.

16 Q. 14. Did you ever see this board—the lower end of it—moved or move it yourself?

A. I moved it myself at the time he showed me the machine.

Q. 15. How would the board act when you moved it; would it remain where you put it or would it come back to its first position?

A. I moved it and let it loose and it goes back.

Q. 16. Did this board stand with its lower edge next to the binder deck?

A. Yes.

Q. 17. Did Mr. Heller show you any other attachment on his machine at the same time?

A. Yes. He made another board on the little elevator in front, on the butt-adjuster.

Q. 18. Please describe this board and state how it was attached.

A. It was a small board. I believe it was a wooden board about 14 or 15 inches long, 8 inches wide, about ½ inch thick. I can't tell how it was fastened.

Q. 19. Was this board movable or was it fastened stiff to the butt-adjuster?

A. I don't know. I can't tell for sure.

Q. 20. Did Mr. Heller put a wind board on your machine; if so, when and of what kind?

A. Yes; he put one on mine in 1879. It was a wooden board about two feet long, 8 inches wide, and 1 inch thick, and was fastened on top of machine by leather hinges.

Q. 21. Did it occupy the same position on the binder as the one on Mr. Heller's machine?

A. Yes.

Q. 22. What held it in place?

A. It had a handle, and when I wanted to move it I moved it by the handle and then secured it in its new position by notches in the handle, which fitted into an iron on top of the machine.

17 Q. 23. Did Mr. Heller also put an attachment on the little elevator or butt-adjuster of your machine; if so, when and what kind?

A. No; I did that myself the next day after Heller was there to put on the wind board. It was a wooden board about one foot long and eight inches wide. It was fastened stiff to the elevator—nailed to it.

Q. 24. How long did you use the machine with these attachments on it?

A. I used it one year and then got a new binder and left the board on the butt-adjuster on, and used that up to and including last year. I only used the wind board one year.

Q. 25. Why did you not put the wind board on the new binder?

A. I did not need it after that; the grain was longer.

Q. 26. Did Mr. Heller tell you of any difference between the attachments on your machine and those on his machine?

A. I do not know.

Cross-examination by Mr. BANNING:

X Q. 27. Did you not understand from Mr. Heller that the attachments on your machine which you have been testifying about were the same as those which he had previously put on his machine?

A. I understand from him that they were different.

X Q. 28. In what respect?

A. I had to move my wind board, and his moved itself.

X Q. 29. Did you ever see the wind board on Mr. Heller's machine except at the one time that you went there for reapirs in 1879?

A. Just that one time.

X Q. 30. Had Mr. Heller's machine been used in the 1879 harvest at that time?

A. I can't say for certain that it had been used that season. It is so long I don't recollect.

18 X Q. 31. Are you certain, it having been so long ago, that you at that time saw any spring connected with the wind board on Heller's machine?

A. Yes; he got a spring on it what moved that board. I moved it myself.

X Q. 32. What kind of a spring was it?

A. I do not know; I cannot tell that any more.

X Q. 33. How large was it?

A. I do not remember that any more.

X Q. 34. Where was it located and where was it fastened?

A. I don't remember.

X Q. 35. How much would it or could it move the lower end of the wind board?

A. Oh, five or six inches, I guess; I do not know exactly how far it moved.

X Q. 36. Did Mr. Heller tell you when he first put the wind board on?

A. I do not remember that.

X Q. 37. Did Mr. Heller tell you that he ever used it?

A. Can't say that he did. I don't know; don't remember.

X Q. 38. When he put yours on did he say which was the better way to make or attach it, like his or like yours?

A. The way Heller had his.

X Q. 39. Then why did he not put his on that way and why did you not insist on him doing so?

A. I was cutting wheat and we had to put it on the best way we could, and Mr. Heller could not go back to get a spring—we had no spring present—and so we put it on that way.

X Q. 40. Did not Mr. Heller tell you yours would do just as well?

A. No, he did not; we could get along, but his was better.

X Q. 41. Do you remember how the grain was in 1879?

A. Short and thin in this part of the country on prairie
19 land. On Heller's farm it was longer and better than on my place, but his was short, too.

X Q. 42. Has Mr. Heller or any one ever told you that he used his wind board that you have been speaking of in 1879 or afterwards?

A. I don't remember that he or any one else told me anything about that.

X Q. 43. How close is your place to Mr. Heller's, and are you good friends?

A. About 9 or 10 miles. We are not angry at each other.

X Q. 44. Have you talked with Mr. Heller about this matter recently?

A. About 8 days ago Heller and another gentleman was around to my house and talked to me about it.

X Q. 45. And they told you about the spring claimed to have been on Mr. Heller's old wind board at that time, did they not?

A. They talked about how it worked, and so on. They wanted to sell them another machine.

X Q. 46. And you have also talked it over since that time with Mr. Parkinson, the defendant's counsel here present, have you not?

A. No, sir; he told me to come in today to say what I saw on Heller's machine.

X. Q. 47. Did you not talk together about what you did see on Heller's machine?

A. No.

Re-examination by Mr. PARKINSON:

R. Q. 48. What has become of the attachment which you put upon your machine?

A. Lost. I looked for them, but could not find them.

R. Q. 49. Did you understand from Mr. Heller that that board which you put on the butt-adjuster of your machine was the same or different from that on his machine? I refer to the time he put it on your machine.

A. It was not exactly like Heller's. Mine was solid, but I can't say how his was, whether fast or loose. I put that on myself after Heller had gone away.

R. Q. 50. Who suggested your putting it on?

A. Mr. Heller, the day before I put it on, and I had seen it on his machine.

Recross-examination by Mr. BANNING:

R. X. Q. 51. And you endeavored to put it on the way Mr. Heller told you and the way you saw it on his machine?

A. No; I did not try to put it on the way I saw it on Heller's, but the best way I could.

R. X. Q. 52. But you got the whole idea from Mr. Heller—the idea of putting such an extension on the butt-adjuster and how to put it on—did you not?

A. Yes.

JOHN STROTH.

Adjourned to May 27, 1887, at 9 o'clock a. m.
May 26th, 1887—7 p. m.

Shortly after the adjournment above noted the witness, John Stroth, returned and asked leave to make a correction in his testimony, and, counsel for both parties being present, says:

I find that it was in 1880 instead of 1879 when I first saw Mr. Heller's machine, and when I have said 1879 in my testimony it should be 1880. I find it was 1880 that I saw Mr. Heller's machine by talking with Mr. Heller and figuring back. I came to America in 1868, to Illinois. I lived ten years in Illinois and came to Kansas in the fall of 1878. The following year, 1879, I broke the prairie and sowed wheat in it that fall, and the next year, 1880, I purchased the machine of Mr. Heller which I have testified about.

JOHN STROTH.

MAY 27TH, 1887.

Said parties met in pursuance to adjournment.
Parties present as before.

ROSINA HELLER, witness on behalf of defendant, on being duly sworn, deposes and says in answer to questions by Mr. PARKINSON, as follows:

Q. 1. State your name and residence.

A. My name is Rosina Heller, and I reside near Dillon, Dickinson county, Kansas. I am the wife of Gottlieb Heller.

Q. 2. Do you remember the first grain binder your husband owned; and, if so, in what year did he buy it?

A. Yes; I remember it. It was in 1878.

Q. 3. Did you ever operate that grain binder; and, if so, in what year?

A. I did run it occasionally when my husband was called away in 1878. I run it in the field, but I do not remember whether it was cutting oats or wheat. I do not know whether I run it after 1878 or not, but I may have done so after 1878, as my husband was sometimes called away.

Q. 4. Do you remember any attachments which your husband put upon that machine; and, if so, what were they?

A. He put a tin on the little elevator to keep the bundle straight on the bottom.

Q. 5. Was this tin on the little elevator or butt-adjuster when you ran the machine in 1878?

A. It was on the machine in 1878 when I run it.

Q. 6. Please examine defendant's exhibit, the Keller butt-adjuster with adjustable extension, and state whether you ever saw it
22 before. If so, what is it?

A. I saw this in 1878. It is the same thing that was on the machine in 1878 to keep the butts of the bundles straight.

Q. 7. Was it attached to the little elevator then in the same way that it now is?

A. It was put on the same way as I see it here, with the exception that it had a rod running straight with the elevator, attached to the machine with a screw, and the other end of the rod was attached to the end of the bent iron or bar that connects the upper side of the sheet-iron extension to the butt-adjuster. There was another rod attached to the little elevator on the top bar through the hole near the lower end of the elevator. The rod run over to the top of the machine to the iron with the notches to move it back and forth.

Q. 8. How would the sheet-iron part act when the elevator or butt-adjuster was moved forward or backward?

A. It kept straight all the time with bottom of the bundle, and when the little elevator moved it moved back and forth with the elevator. It holds itself straight in the same way with the elevator—straight with the bundle.

Q. 9. As I understand you, when the elevator was moved the sheet iron also moved, but moved in such a way that the sheet iron kept square with the butts of the bundle. Is that correct?

A. Yes; it held the bottom of the bundle straight.

Q. 10. Did Mr. Heller put any other attachment on the first machine? If so, what?

A. He put another tin on the binder, and if the heads of the grain fell on it it would give or move. We called it a wind board.

Q. 11. How was it fastened to the machine?

23 A. It was fastened—I do not know whether it was screwed or wired. It was fastened on the back part of the binder.

Q. 12. How large was it?

A. I can't say the exact size. I did not measure it.

Q. 13. Did your husband afterward put on a different kind of wind board?

A. In 1881 my husband got another binder, and he put on a board with a spring.

Q 14. Was it the first year he had the other machine?

A. No; the second machine he got from Mr. Dennett. In 1878 he put on the tin, and in 1881, when he got the new machine from Mr. Dennett, he put on a board with a spring. I do not know positively whether it was in 1880 or 1881 he got the machine from Mr. Dennett and put on the board with a spring. He put on the board with a spring the same year he bought the second machine.

Q. 15. What kind of a board was it on the second machine?

A. It was a wooden board with a spring.

Q. 16. Do you remember how it was fastened to the machine?

A. The wind board was put on with hinges.

Cross-examination by Mr. BANNING:

X Q. 17. There was no spring connected with the wind board on the first machine, was there?

A. He put a tin on what gives. I do not know whether there was an extra spring on it.

X Q. 18. But you do know that there was a spring on the wind board which your husband put on his second machine; the one he bought of Dennett in 1880 or 1881?

A. On that wind board there was a spring.

X Q. 19. How was the bar or iron which was secured at its lower end to the bent portion of the iron or bar connecting the upper
24 end of the sheet-iron extension of the butt-adjuster attached to its upper end to the frame of your husband's first machine?

A. It was put on the machine with a screw into wood, the screw fastening it to a board at the top of the machine. It was screwed fast to the board. I never tried it to see if it was perfectly tight or could be moved a little.

X Q. 20. But according to your best recollection it could not slide up or down, could it?

A. It was tight on the top.

X Q. 21. In what direction did that bar extending up aside the butt-adjuster run—parallel with the upper board of the butt-adjuster or otherwise?

A. It run straight, but I did not measure whether it was a little wider at one place than another or not.

X Q. 22. How was it when the butt-adjuster was worked?

A. It was always straight, but the sheet iron moved or swung.

X Q. 23. You worked a good deal with these machines and understood the construction of the parts you have been speaking about pretty fully, did you not?

A. I used them once in a while when my husband was away, and I understood about this, that the sheet iron moved to keep the butts straight. I understood the parts I have been testifying about.

ROSINA HELLER.

GOTTLIEB HELLER, witness produced on the part of the defendant, being by me first duly sworn, on oath deposes and says, in answer to questions of Mr. PARKINSON, as follows:

Q. 1. Are you the same Gottlieb Heller who has always testified in this cause?

A. Yes, sir.

Q. 2. Did you ever act as agent for Parker & Dennett or the Beloit Harvesting Machine Co.; and, if so, in what year
25 did you begin?

A. I did, in 1880. I have been agent for that company and its successors ever since.

Q. 3. Did you ever sell a harvesting machine to John Stroth, of Lyon township, of Dickinson county, Kansas; and, if so, when?

A. I sold him a machine in the spring of 1880. My book shows April 9, 1880. The original entry is in German and translated is is as follows:

One machine sold to John Stroth, April 9th, 1880, Aroma post office, southeast quarter, section four, township 16, range 4 east; notes due 1st Oct., 1880, $60.00; 2nd note, 1st Oct., 1881, $66.00. One harvester.

Q. 4. Did you also sell him a binder?

A. I also gave him an 1878 binder with that machine, provided if he liked it he could keep it, and if he didn't he could give it back again.

Q. 5. When did you get your second harvester machine and binder?

A. The first one I got in 1878, and Dennett sent me the second binder in the spring of 1880, March or April, I believe. In 1881 I got a new machine and binder of the standard style; also from Dennett or Parker and Dennett.

Q. 6. Did you ever put a sheet-iron wind board on your first machine; if so, when?

Objected to as having been already gone over at great length.

A. Well, I had that on my first machine for awhile. I put it on right at first when I found something was necessary to hold the heads up. When I tried the binder I found it was necessary to have something on to hold the heads of the grain up and then I put a piece of sheet iron that answered the purpose, but not fully.
The sheet iron would give a little, and so I found I had
26 better make a board give with a spring; that is the board I testified about before. The sheet iron reached down to the heads of the grain from the harvester.

Q. 7. How did the sheet-iron wind board compare, in respect to size and position in the machine, with the wooden wind board you afterwards put on it?

A. About the same, as nearly as I can remember.

Q. 8. How long did you keep it on the machine?

A. I cannot tell exactly; a few days. I was fixing many different things. I cannot tell just when I did it.

Q. 9. Did you change to the spring wind board the same season?

A. Yes.

Q. 10. Did you ever have a rigid butter extension on your first machine?

A. The first one I made was a stiff one, sheet iron, too. I could not tell how long I kept that on. I changed it the same season to Exhibit Heller Butt-adjuster with Adjustable Extension.

Q. 11. Did you put a butter extension on the binder you got in the year 1880?

A. Yes; I put one on in stiff form—a board instead of sheet iron. It was fastened with heavy hoop iron.

Q. 12. How was the hoop iron fastened to the adjuster?

A. With bolts or screws; I do not know now any more.

Q. 13. Do you remember which of your binders it was Mr. Stroth saw?

A. I could not tell that; it was too long ago.

Q. 14. Have you made search for the spring wind board which you put upon your machine in 1878?

A. Yes; I was hunting last September for it, and lately, when we were notified, my wife thought she knew where it was and we looked for it, but it was a board from a threshing machine.

27 Q. 15. From what did you take the sheet iron of which this butt-extension exhibit was made?

A. From an old self-rake machine.

Q. 16. Did you find any of the wind boards or butter extensions which you used on your machines except the exhibit here?

A. Yes; I found one, the first sheet-iron one. I sent that to the Milwaukee Co. shortly before I sent this exhibit; that was a butter extension. I did not find any wind board.

Cross-examination by Mr. BANNING:

X Q. 17. As I recollect your former testimony and your son's, none of these butter extensions and wind-board devices which you have been speaking about was used in the harvest of 1879 except for, perhaps, a half day or so, because of the shortness of the grain that season. Is this correct?

A. Yes. Of course I could not say how long they were used; it might have been a couple of days; but I know they were not used long in 1879. We headed our grain that year.

X Q. 18. The butter-extension and wind-board devices were not found practicable for the short grain of that season, were they?

A. It was not on account of the butter extensions and wind boards, but on account of the grain not being long enough to bind by machine.

X Q. 19. As I also recollect your former testimony, the binder deck of your 1878 machine was hollowed out so as not to present a smooth surface?

A. Yes; that is right. It was about the shape of the lower edge of the sheet-iron part of the Defendant's Exhibit "Heller's Butt-adjuster with Adjustable Extension"—that is, this part is made to fit it.

28 X Q. 20. How was your next machine in this respect?

A. The binder deck was flat or smooth like those they have now.

X Q. 21. When did you cease to use the binder deck of your first or 1878 machine?

A. We used it as long as we used the binder. We used it up to 1883, I think. I am not sure.

X Q. 22. You got a new binder from Dennett in 1880, did you not?

A. Yes; it had a smooth stand and deck.

X Q. 23. You used that binder in the harvest of 1880, did you not?

A. Yes; we used both the old one and the new one.

X Q. 24. How much did you use the old one in that harvest or succeeding harvests?

A. I cannot tell that. It was so long since I used it, and I had some other business working for the company.

X Q. 25. Did you use the same old butter extension and wind board for the new binder which you got from Dennett in 1880 that you had previously used, or did you make new ones for it?

A. I made a new butter extension and wind board for it, as the surface of the binder deck was different.

X Q. 26. It is very important that the lower edge of the wind board be adapted to fit the surface of the binder deck snugly, is it not?

A. Of course it can't fit snugly. It must be free so as to work or give when the heads strike it.

X Q. 27. What kind of a wind board, if any, did you put on your second binder—the one you got in 1880?

A. As far as I can recollect, I put on a wooden board with a spring.

X Q. 28. Are you positive as to this?

A. I know that after I made the first one I did not make a wind board without a spring on my machine.

29 X Q. 29. How much did the spring, which you say you put on with your wind-board in 1878, cause or permit the board to move in practicable work?

A. It gives over as far as the heads of the grain push it back. You have to move the binder and set it according to the length of the grain or straw. If the binder was far back, the board had to be far back, too. If you set the binder far ahead, the spring would not allow the board to move so much; but if you set it far back it would allow it to move more.

X Q. 30. So that it would all depend on how you would set the binder?

A. Not exactly on the binder alone, as the spring would have to work, too. The board could be forced back to the end of the binder by the pressure of the heads of the grain, and then forced forward by the spring according to its strength.

X Q. 31. I understand you to say that the operation of move-

ments of the wind board in your 1878 machine were the same in this respect as in your 1880 or later machines.

A. Yes; about the same. Yes; about the same principle; but the shape may be a little different. I do not know how much, of course, as it is too long for me to carry all that and this in my head. The movement of my 1878 wind board was about the same—that is, about as free and far as is my later machines.

GOTTLIEB HELLER.

REINHARD RUBIN, witness produced on the part of the defendant, being by me duly sworn, on oath deposes and says, in answer to questions of Mr. PARKINSON, as follows:

Q. 1. Are you the same Reinhard Rubin who has already testified in this cause?

A. Yes, sir.

Q. 2. You were asked in your former deposition whether the wind board upon the Heller machine had a spring about it
30 or not, and you answered that you did not remember. Can you now remember?

A. I can.

Q. 3. What kind of a spring was it?

A. It was something in the shape of the one which I here produce, but was steel wire and heavier; it was not quite a quarter of an inch in diameter; about $\frac{3}{16}$ of an inch, I should think. It was about the length of the wire I here produce, about 14 or 15 inches long from end to end, not counting but once across the coils, and it had 2 or 3 coils in it.

The wire produced by the witness is offered in evidence and marked "Defendant's Exhibit Rubin Model of Heller's Spring."

Q. 4. To what were the ends of the spring attached?

A. The longer end of wire was attached to the wind board and the other to the binder frame.

Q. 5. Since your last answer you called my attention to your answer to cross-question 58 in your original deposition; to what time did you understand that question to relate?

A. Relates to the time when George Heller stopped the machine in the field and showed me what his father had made.

Q. 6. Was it at that time you noticed the spring?

A. No; it was not that time; it was after that time that I saw the spring. When that question was asked my attention was on the time I saw the machine in the field.

Cross-examination waived.

RICHARD RUBIN.

31 For one ($1) dollar and other good and valuable considerations to me in hand paid, the receipt of which is hereby acknowledged, I, William F. Olin, of Chicago, Illinois, have sold, assigned, transferred, and set over, and by these presents do sell, assign, transfer, and set over, unto William Deering, of Chicago, Illi-

nois, all my right, title, and interest in and to letters patent of the United States No. 223,812, issued to me January 27, 1880, together with any and all claims for demands arising or growing out of past infringements of said letters patent; to have and to hold the same to him, the said William Deering, his heirs, executors, administrators, and assigns.

In witness whereof I have hereunto set my hand and seal this 27th day of November, 1883.

WILLIAM F. OLIN. [SEAL.]

32 *Extracts from Depositions of John F. Appleby and Others.*

"Depositions on behalf of the preceding defendants jointly, taken at the West hotel, Minneapolis, Minn., on the 15th day of June, 1887, before Daniel Byrnes, Esq., notary public, formal notice being waived by counsel for the complainant.

"Present: Mr. E. Banning, on behalf of complainant; Mr. R. H. Parkinson, for the McCormick Harvesting Machine Company, and Mr. P. C. Dyrenforth, on behalf of the Winona harvester works.

"JOHN F. APPLEBY, being duly sworn, deposes and says:

"Q. 1. Please state your name, age, residence, and occupation.

"A. John F. Appleby; age, forty-seven; residence, Minneapolis; occupation, storage and real estate.

"Q. 2. Where did you reside before you came to Minneapolis?

"A. Whitewater, Wisconsin; before that, Beloit, Wisconsin.

"Q. 3. Are you the John F. Appleby who appears as the patentee of letters patent No. 212,420 for grain-binders?

"A. I am.

"Q. 4. You are also the patentee of various other grain-binder patents, are you not?

"A. I am."

"Q. 85. Are you the John F. Appleby of the Appleby & Bullock patent for grain-binders, which exhibits, among other things, a traveling butter on the deck of the machine?

"A. I am.

"Q. 86. Can you state when that traveling butter, as shown in that patent, was first constructed and applied to grain-binders?

"A. I can; during the harvest—the fall of 1877.

"Q. 87. Was it used in the shop on a working machine during the fall of 1877?

"A. It was.

"Q. 88. Where and by whom?

"A. In the shop of the Parker-Stone works; the machine was operated by Bullock and myself and was run by power.

"Q. 89. Was it in the presence of others?

"A. It was.

"Q. 90. When was it put on machines for sale?

"A. It was put on the 115 machines built for the harvest of 1878.

"Q. 91. Put on during the spring of that year?

"A. They were built and it was put on during the winter of 1877–'78.

"Q. 92. When was it first used in the harvest field?

"A. In the harvest of 1878 near Belleville, Ill.

"Q. 93. Has it been placed on binders of the Appleby construction during each season since that time?

"A. It has.

"Q. 94. As first used in the fall of 1879 how did it operate?

"A. Satisfactorily."

"X Q. 128. The butt board which you have spoken about using on your machine did not have any extension below it, did it?

"Objected to as immaterial and irrelevant and as not responsive to the direct examination.

33 "A. It did not.

"X Q. 129. Did your machines on which that butt board is used have any wind board?

"A. They did.

"X Q. 137. Limiting these questions to the butt board which you say you used on your machines, what is your answer? Did you ever see such a machine at a fair in the State of Wisconsin before you adopted your butt board?

"A. I never did.

"X Q. 138. Limiting these questions to the spring-compressor features, did you ever see that on any machine at a fair in the State of Wisconsin or elsewhere before you were engaged at Deering's works superintending the building of his Appleby twine binders?

"Same objection.

"A. I did not."

"EDWIN D. BISHOP, a witness called on the part of the defendant, having been duly sworn, testified:

"Direct examination by Mr. PARKINSON:

"Q. 1. State your name, age, residence, and occupation.

"A. Edwin D. Bishop; age, 56; residence, Charles City, Iowa; occupation, a farmer.

"Q. 2. Are you acquainted with John F. Appleby; and, if so, how long have you known him?

"A. I have known John F. Appleby since 1865, I think; that was my first acquaintance, when he came home from the army. I had seen him before that, but was not personally acquainted with him. I became acquainted with him in 1865 or 1866; I would not be positive.

"Q. 3. Were you ever interested with him in getting up a twine binder for harvesting grain?

"A. I was."

"Q. 45. Do you remember when the swinging butter board, with the traveling apron on it, was first put on this machine?

"A. That was the first that I recollect; it was put on after the harvest of 1877.

"Q. 46. Was it on the machine sold for the harvest of 1878?

"A. It was on every machine sold for the harvest of 1878.

"(All the foregoing questions and answers relating to the butt-adjuster are objected to on the ground that, as complainant is informed, that said adjuster has been the subject of an interference between Bullock and Appleby and Flenniken and McGregor and Wm. F. Olin, and has been decided in favor of Olin and the Olin patent in suit accordingly issued; and the McCormick Harvesting Machine Company, being licensees and claiming under the Bullock and Appleby and Flenniken and McGregor, who have acquiesced in the decision awarding priority to Olin in said interference, are now estopped from questioning the same or attempting to prove priority of said invention on Appleby.)

"(The recital of the foregoing objections *are* denied by defendant, as well in respect to their accuracy as in respect to their legal effect.)

34 "LORENZO G. WALKLEY, being duly sworn, deposes and says, in answer to interrogatories by R. H. PARKINSON, as follows:

"Q. 1. What is your name, age, residence, and occupation?

"A. Lorenzo G. Walkley; 55 years of age; residence, Beloit, Wisconsin; occupation, farming.

"Q. 2 Were you ever in the employ of Parker & Stone at Beloit; if so, in what capacity?

"A. I was. I commenced with Parker & Stone in the first place in 1858 on wood-work.

"Q. 3. How long did you continue to work for them?

"A. I worked for them till 1878—the fall of '78.

"Q. 4. What work were you doing in 1875 and through that year on to '78?

"A. I was working on wood-work from 1859 to 1878.

"Q. 5. Do you remember anything about twine binders being built there by John F. Appleby?

"A. I do.

"Q. 5½. When did you first see a twine binder in the works of Parker and Stone?

"A. It was in 1875.

"Q. 6. Were you working there through the whole year of 1875?

"A. I was.

"Q. 7. What time in '75 did you first see a twine binder made by Appleby?

"A. It was in the fall of 1875, as near as I can remember.

"Q. 8. Did you or did you not see any twine binder operated by Appleby in the fall during that year?

"A. I did not. They had one out for awhile, but I wasn't with it. I guess I said fall of 1875, but it was the summer.

"Q. 9. Am I to understand by your last answer that you saw one of these twine binders in the summer of 1875?

"A. I saw a twine binder, but did not see it work in the field. I was not out with it."

"Q. 24. Do you remember about how many twine binders were made for the harvest of '78?

"A. There was some over a hundred. I couldn't say exactly the number manufactured there in all. We manufactured some for another firm in 1878. I guess I had better correct that. I could not swear positively that we manufactured for another firm in '78. My memory isn't such that I could place it in '78, as I have not thought it over. It might have been in '79.

"Q. 25. Do you remember distinctly whether the hundred or more machines that you have referred to were made for the season of 1878?

"A. I do. They were made for the season of 1878.

"Q. 26. Do you know how early they began to make those machines?

"A. They began in the fall of '77 and winter of '77 and '78.

"Q. 27. Were these machines placed on sale?

"A. They were.

"Q. 28. How many were sold during the season of '78—about how many?

"A. I think, to the best of my memory, most all of them were sold. The harvest did not work just right, and a great many of them were returned on account of the harvester.

35 "Q. 29. Do you know whether or not the larger part of them were kept and paid for?

"A. I think they were."

"Q. 33. Do you remember when the swinging traveling butter was first put on the deck of the machine at Parker & Stone's?

"A. We got up a new harvester and changed the binder some in the machine of '77 and winter and spring of '78. We put one onto that machine. Now, this was the machine we used in the summer of '78. We put a butter apron onto that machine. I would like to change this. We manufactured this machine for '78—the one we manufactured in the fall of '77—and this machine had a butter apron put on, as we called it, the adjuster. This was the first time we put a butt-adjuster on. We manufactured it first in the fall of '77 and put it on all of those Appleby binders in '78.

"Q. 34. Was this adjuster as first put on the machine pivoted at the top so as to swing?

"A. Yes, sir; it was.

"Q. 35. Did you know whether it was put on the machine in the fall of '77, or when it was put on?

"A. We put it on the machine in the fall of '77.

"Q. 36. When was the first used in the field?

"A. 1878, as near as I can remember—the summer of 1878.

"Q. 37. Do you remember whether it was on all the machines manufactured for the season of '78?

"A. I think it was; they were all fixed for it.

"All the foregoing questions and answers relating to the butt-adjuster are objected to on the ground that, as complainant is informed, said adjuster had been the subject of an interference between Bullock and Appleby and Flenniken and McGregor and Wm. F. Olin, and had been decided in favor of Olin and the Olin patent in suit accordingly issued; and the McCormick Harvesting Machine Company, being licensees and claiming under the Bullock and Appleby and Flenniken and McGregor and Olin, who have acquiesced in the decision awarding priority to Olin in said interference, are estopped from questioning the same or attempting to prove priority of said invention in Appleby.

"The recital of the foregoing objections *are* denied by defendant, as well in respect to their accuracy as in respect to their legal effect."

"To the testimony of H. B. Renwick the following should be added:

"Q. 25. Have you examined and do you understand the Stewart patent No. 272,598 (being one of the patents sued upon herein), having particular reference to the third, fourth, ninth, and tenth claims thereof?

"A. I have frequently examined the patent referred to in the question, not only in particular reference to the claims mentioned in the question, but to all the claims of the patent."

"I have caused a model to be made of this contrivance and now produce it.

36 "The model referred to is here offered in evidence and marked Defendant's Exhibit Model of Steward Patent No. 272,598."

"The testimony of Gottlieb Heller describes a butt-adjusting apron, mounted, like Steward's and others I have referred to, at the upper corner of the binding deck nearest the horses, and this abutting apron is provided with a link, by means of which it can be set and held at different angles of inclination, and this abutting apron has attached to its lower end a board, which is moved and operated substantially in the same way as the board *d'* of the Steward patent."

Endorsed on cover: Case No. 14,369. Supreme Court U. S., October term, 1894. Term No., 54. William Deering, appellant, *vs.* The Winona Harvester Works *et al.* Stipulation for addition to printed record. Filed Sept. 1, 1894.

Office Supreme Court U. S.
FILED.
OCT 15 1894
JAMES H. McKENNEY,
CLERK.

IN THE

# Supreme Court of the United States.

OCTOBER TERM A. D. 1894.

No. 54.

WILLIAM DEERING,
Appellant,
vs.
THE WINONA HARVESTER WORKS, C. L. BONNER, J. J. RANDALL, CASPAR F. SEARCH and C. H. PORTER,
Appellees.

*Appeal from the Circuit Court of the United States for the District of Minnesota.*

## BRIEF AND ARGUMENT ON BEHALF OF APPELLANT.

THOMAS A. BANNING and EPHRAIM BANNING,
for Appellant.

PHILIP C. DYRENFORTH, Esq.,
for Appellees.

# Supreme Court of the United States.

| | |
|---|---|
| WILLIAM DEERING, Appellant, vs. THE WINONA HARVESTER WORKS, et al, Appellees. | *Appeal from the Circuit Court of the United States for the District of Minnesota.* |

## BRIEF AND ARGUMENT FOR APPELLANT.

MAY IT PLEASE THE COURT:

This is a bill in equity under letters patent of the United States No. 223812, issued January 17, 1880, to William F. Olin for improvements in Harvesters, printed at page 14 of the Record, and letters patent No. 272598 issued February 20, 1883, to John F. Steward for improvements in Grain Binders, printed at page 7 of the Record. The Court below dismissed the bill on the ground that the Olin patent was not infringed and that the Steward patent was invalid by reason of what was known as the Heller use and therefore not infringed.

We shall insist that the Court erred in its construction of the meaning and scope of the Olin claims, and in holding that the Steward patent was met or anticipated by the

Heller use, and in not holding that the Olin and Steward patents were valid and infringed by the defendants.

In the Court below the bill and record involved five different patents. The appellant appealed from the decision of the Circuit Court only so far as it related to the Olin and Steward patents, and acquiesced in its decision as to the other patents. By stipulation the portions of the record below relating to the patents from which no appeal was taken were omitted from the transcript and only such portions of the record as related to the Olin and Steward patents certified up and printed.

## THE OLIN 1880 PATENT.

The defendants are charged with infringement of several of the claims of the Olin patent, but inasmuch as the question of infringement must turn upon the construction that is to be given to the patent, the entire case can be presented in this Court under the discussion of the first claim. We have concluded, therefore, to direct our argument to the first claim of the Olin patent, as in this way the case can be presented with greater brevity and simplicity.

The first claim of the Olin patent reads as follows:

> "1. In combination with a harvester-elevator, a swinging elevator pivoted at its lower end and suitable devices for shifting its upper end, whereby the swinging elevator forms a means for elevating the butts of the grain and delivering grain of different lengths at the same point, substantially as specified."

This claim was allowed by the Office precisely as filed, as will appear from reference to the file wrapper and contents of the Olin patent printed at page 370 of the record. It was originally numbered 2, but was afterwards numbered 1, and appears in the patent *verbatim* as filed in the office. The operation and functions of the elements forming the combination of this claim will be

best understood after a brief consideration of the Art to which they belong and of which they form a part.

The devices forming the subject matter of the Olin claims are applicable to the type of harvesting and binding machines which produces a flowing stream of grain and operates upon the grain while in a flowing condition. The standing grain is advanced upon by the machine, and as it is cut, it falls backward upon the harvester platform. The harvester platform is provided with an endless delivery canvas which carries the grain as it falls on it toward the stubble side of the machine. Toward the stubble side of the machine is the main supporting or driving wheel of the harvester, and it is necessary to elevate the grain over this wheel in order to deliver it to the binder. The continuous movement of the delivery canvas carries the grain in the direction of the main wheel in the form of a continuous flowing swath. In order that the grain may be properly delivered outside of the main wheel the conveying devices are directed upward at the stubble side of the harvester platform where the grain is received as it falls, and the inclined or upwardly directed portion of the conveying devices continues to carry the swath and deliver it into the binder receptacle upon the stubble side of the main supporting or driving wheel. As the grain is cut it falls back on to the moving canvas, and passes across the harvester platform, The instant it falls upon the moving canvas it is moved toward the stubble side of the machine. The butts of the straws, however, being more or less entangled with the standing grain, are retarded so that the straws assume a diagonal position across the harvester platform. Moreover, many of the straws, from their natural inclination while standing, fall in a diagonal position. Without something, therefore, to even the straws the grain would pass across the harvester platform and up the elevating devices over the driving wheel and into the final or binding receptacle with the heads in advance of the butts which would interfere with the proper binding of the grain.

The diagonal position of the grain on the harvester platform is well illustrated in the copies of the photographs shown at page 154 of the record. Moreover, the different conditions of the grain as to length require some means whereby the band may be placed substantially centrally to its length; that is, if the straws, after being cut are twelve inches long, the band should be placed about six inches from each end, but if the straws are five feet long, it should be placed about two and one-half feet from each end. Furthermore, the butts of the grain assume an uneven position as the straws fall on to the harvester platform. Some straws after being cut slip down so that when they assume a prostrate position their butt ends will be several inches in advance of the butt ends of the other straws.

The object of the devices of the Olin patent is intended to correct these various defects. They are intended to advance the butts more rapidly than the heads so as to straighten the position of the straws. They are intended to bring the straws into the proper position for central binding. They are intended, lastly, to even the butts so that the butt-end of a bound bundle will be comparatively square and even. In accomplishing these objects the mechanism of the Olin claim under consideration is intended to act upon the swath of flowing grain and change its direction, pushing the straws endwise so that they may be delivered into the binding receptacle in proper position to be bound centrally, or, in otherwords, so that the middle of the length of the straws shall be placed substantially in the middle of the binder receptacel. A kind of shifting action is required so that the swath of grain may be changed in its direction of movement to reach any desired given point. Thus its path may be made to diverge from a right line a little or much, as may be required, just as a railroad switch adapted to turn a train on to three or four different tracks, at will, may be set to direct the train a little to the right, or more, depending upon the point to which the switch is turned. In direct-

ing the course of the flowing stream of grain the butts are advanced so as to come even with the heads, and the separate straws pushed into the bundle so that the butts will be even and a flat or square end imparted to the bundle. All of these objects enter into the theory of construction of the Olin devices.

As we have seen, three functions must be performed in order to perfect the swath of grain and deliver it centrally into the binding receptacle. These functions consist in hastening the butts, in evening the butts and in changing the direction of movement so that the middle of the straws shall be in the middle of the receptacle or nearly so. The photograph on page 158 of the record will illustrate this. The photographs on page 154 of the record show the grain as it travels on the receiving platform, while the photograph on page 158 of the record shows the grain after it has reached the binding side of the receptacle and is assuming its final position in the bundle. It will be observed that while on the platform the straws are angular or diagonal across the platform, while the last photograph shows that the butts have been advanced more and more until as the straws reach the binding receptacle they are in substantially a parallel position. A casual glance will show that an important result has been accomplished. It is the means for accomplishing this result that are now under consideration.

The patent states the object to be accomplished and and says that "there shall be no stoppage in the flow of the grain in its passage to the place of delivery;" that "The butts of the grain shall be carried up parallel or nearly so with the heads of the grain so as to deliver the grain in proper shape for binding," and that "The grain shall be delivered to the receiving table so that it can be bound at or near the middle."

The means employed by Olin to accomplish these various results consist in combining with the other parts

an endless canvas or conveyor, mounted on rollers standing endwise, and moving in the direction of the grain delivery. This conveyor of necessity has to perform its work upon the butts of the grain before the straws are compacted into a gavel to be bound. Of necessity therefore it has to be interposed at some place *between* the point where the grain leaves the harvester platform and where it is bound into bundles. Unless arranged *intermediate* between these two points—where the grain leaves the harvester platform and where it is bound into bundles—it cannot perform its offices. In order to move the grain and direct the course of the stream it is necessary that the delivery end of this supplementary conveyor shall be movable, fore and aft, to guide the grain. The essentials of the Olin invention, therefore, of necessity consist in the interposition of a supplementary conveyor *between* the point where the grain leaves the harvester platform and where it is bound, moving in the direction of the flowing stream of grain, and movable or shiftable, fore and aft, at its *delivery* end. The moving canvas of this supplementary conveyor has to move with somewhat greater speed than the main conveyors, so as to bring the butts up even with the heads. It has to be a *positively moving* conveyor as otherwise it would retard instead of accellerate the progress of the butts. It has to be a *swinging* or *shiftable* conveyor, as otherwise it could not be made to direct the flowing stream of grain so as to bring the straws into position to be bound at the middle of their length. These form the *essentials* or absolutely requisite characteristics of the invention under consideration. It must do its work *before* the grain is bound. It must be a conveyor *traveling* in the *direction* of the grain delivery, as otherwise it would retard the butts. It must travel with somewhat *greater* speed than the main conveyors or it could not bring the butts up even with the heads. It must be *movable* or shiftable at its *delivery* end, as otherwise it could not regulate the course of the stream.

With this understanding of the work to be done and

the necessities of the problem to be solved, we are in a position to consider the construction that should be given to the Olin patent, so as to make it cover, if possible, the real invention of the patentee.

Referring to the first claim of the Olin patent already quoted, it will be observed that the first element mentioned in the claim is a "harvester elevator." The harvester-elevator is the endless moving canvas which carries the grain from the harvester platform, on which it falls when cut, to the binding receptacle. The next element mentioned in the claim is a "swinging-elevator." This elevator is the one which engages with the butts of the grain so as to shift them endwise and also carry them forward to reach the binding receptacle simultaneously with the heads, and to direct the flowing grain more to one side or the other, so that a band will be placed by the binding mechanism at about the center of the bundle. It is described as "pivoted." This, of course, is to permit its free end to be moved sideways as may be necessary to direct the flowing grain as above explained, but the claim describes it as pivoted at its "lower end." This is the way it is shown in the drawings and described in the specification in which the *receiving* end of the swinging elevator is the *lower* end. In drawing his claims it was the most natural and convenient form of language to use to speak of the receiving end of the butt elevator as "its lower end," as the *lower* end is really the *receiving* end of the elevator which first engages the butts of the grain as the invention is illustrated in the patent. The words describing it as "pivoted" at its *lower* end really describe it as pivoted at its *receiving* end. To speak of it as pivoted at its *receiving* end would be, so far as the particular construction of the machine represented in the drawings is concerned, precisely equivalent to speaking of it as pivoted at its *lower* end. It was necessary that the *pivotal* point should be at the *receiving* end of the swinging elevator.

In the defendant's machines we find a "harvester-ele-

vator"—a canvas elevating the grain to the binding receptacle—in combination with a "swinging elevator" pivoted at its *receiving* end, which accomplishes all the functions and results accomplished by the combination described in the first claim of the Olin patent, but in the defendant's machines the course of the elevating canvas is upward for a certain distance, when it turns *downward* into the bundle receptacle. The "swinging elevator" which adjusts the butts of the flowing grain is arranged at the point where the downward direction of the elevating canvas begins, so that the *receiving* end of the swinging elevator happens to be, in the defendant's machine, the *upper* instead of the lower end. But in the defendant's machines, as well as in the Olin patent, the *pivotal* point of the swinging elevator is at the *receiving* end where the swinging elevator first engages with the butts of the flowing grain. If our construction of the Olin patent be correct, namely, that by the *lower* end of the "swinging elevator" is meant the *receiving* end, then the case must be decided in favor of the appellant.

It thus appears that a question of construction of the claims of the Olin patent arises at the threshold. We insist that wherever the claims speak of the butt elevator or carrier as pivoted at its *lower* end it means pivoted at its *receiving* end. We do this upon the established rule that the proper construction of a patent is that which will make its language operative if possible to cover the real invention, and that the construction which will prevent its covering the real invention of the patentee should be rejected unless to do so would do violence to the language of the claim. This rule of construction is so elementary that we deem it unnecessary to quote authorities in support of it.

If the term "receiving end" had been originally used and applicant had been compelled to substitute the term "lower end," there would be some ground for now saying that he had limited his claim, but, as a matter of fact no

reference could be found in the prior Art. The construction that we are contending for was adopted by the patent office in interference proceedings that arose during the pendency of the Olin application. In those proceedings the office based its action upon the idea that the *lower* end of the elevating canvas was synonomous with the *receiving* end and that the use of either term meant the other. This fact will clearly appear from a consideration of the patent office proceedings.

While the Olin application was pending, another application was made by parties named McGregor and Flennekin. This application was thrown into interferference with that of Olin. The McGregor and Flennekin application showed grain adjusting devices comprising a a traveling canvas advancing the butts of the grain in all respects like that used by the defendants. To be more specific; — The McGregor and Flennekin application, which as to some of its claims was in interference with the Olin application, shows a butt adjuster similar to that of Olin's, except that it is located on the *decline* part of the line of grain travel instead of the *incline* and is pivoted at the receiving end which in this case is at its *upper* end instead of being pivoted at its *lower* end. In other words, it shows the defendant's construction and location exactly. Sketch 11 following page 158 of the record shows the McGregor and Flennekin construction that was involved in the interference with Olin. The Office,—with the Olin and McGregor & Flennekin applications before it, in which one butt adjuster was located on the *incline* and pivoted at its *lower* end, and the other was located on the *decline* and pivoted at the *upper* end—or, in other words, both pivoted at the *receiving* end,—regarded the two constructions as *identical* and threw the applications into interference. If they had regarded *location* as important or imparting any difference to the two devices, there would have been no interference declared. The fact that an interference was declared conclusively shows that in the opinion and judgment of the Office it is wholly *immaterial* whether the butt adjuster be arranged at the

one side or the other—on the incline or the decline—as by Olin or as by the defendants. That the Office was right in this is proven by the fact that devices are used by thousands in both positions.

The issues between Olin and McGregor & Flennekin as defined by the Office, which was the official statement of the invention involved, as appears from page 377 of the Record, read as follows:

> "First, an endless belt moving in the direction of the grain delivery, operating in contact with the end of the grain to deliver it to a binding mechanism.
>
> Second, an endless belt mounted in a swinging frame and moving therein in the direction of the grain delivery, operating in contact with the end of the grain and made adjustable to vary its inclination relatively with the direction of the grain delivery to present the grain having long or short straw centrally to the binding mechanism.

We thus have in the declaration of the interference between Olin and McGregor & Flennekin a condensed statement on the part of the Office as to the invention involved. The Office in declaring the interference said this invention was "embraced in Olin's application." That this is the construction that should be placed on the Olin claims, so far as the Office could construe such claims, is evidenced by the fact of the interference. We may therefore consider that there has already been a construction placed upon the Olin patent by a tribunal acting judicially, performing judicial functions under the statute which gave jurisdiction, in favor of the very construction for which appellant is contending in this Court—a construction which regards it as *immaterial* whether the claims speak of the *upper* and *lower* ends of the butt adjuster, or of their *receiving* and *delivery* ends.

If the Court construe the Olin patent as appellant

insists that it should be construed, then there can be no question as to the infringement by the appellees. We take it, in fact, that the appellees admit infringement if the patent is to be construed as appellant contends. It may be well, however, to quote from the testimony of one or two of the witnesses on the question of infringement. We will begin with the expert, Mr. Bates, an expert called by the complainant in th court below, commencing on page 83 of the record.

> "In binding machinery of the kind in controversy the grain is received upon the carrier platform and elevated from it to the point where it is bound. In many cases in being thus elevated it is carried to a higher level than that where the binding is done, and therefore descends a short distance to reach the binders. The machine illustrated in the Olin patent is one of this class. In it the grain is elevated from the carrier platform H to the point P where it is to be bound. This is done by means of an endless belt or belts. In order that long and short grain may be delivered at the same point, a second endless belt is provided, which engages the butts of the grain and pushes the same back so as to bring the middle of the swath to the desired point. This second endless belt is marked Q in the drawing, and is so arranged that it not only pushes the grain back, but also acts as a conveyor to move the butts forward in their path to the binder. As shown and described in the patent, this belt Q is arranged with one end low down near the carrier platform H and the other end up near the highest point of travel of the grain, but it is obvious that these positions might be changed and the device still operate in exactly the same way to push the grain back and to elevate the butts forward. For example, the receiving end of the belt Q might be further along in the path of the grain, even at the highest point on its path or

beyond it, and the delivery end also further along, even at the point P or near it. It is also obvious that whatever the position of the belt Q on the machine its delivery end must be moved back and forth to accommodate grain of different lengths, as the short grain must be pushed further back than longer grain.

"I therefore understand the essentials of this device to be that it shall be combined with the devices which elevate or convey the grain from the carrier platform to the binder; that it shall be pivoted at its receiving end so that its delivery end may swing back and forth to accommodate grain of different lengths, and that its delivery end shall be provided with devices by which it may be moved back and forth for that purpose, and that it is immaterial at just what point in the path of the grain said swinging conveyor Q is located.

"This is the combination which I understand to be meant by the first claim of this Olin patent, namely, the conveyor which elevates the grain from the carrier platform to the binder, the swinging conveyor which engages the butts of the grain and pushes them back so that the bundle will be centrally bound and assist in conveying said butts to the binder, the pivot at the receiving end of the swinging conveyor, and devices for shifting the delivery end of the same.

"I am aware that in the first claim the said swinging conveyor is spoken of as being pivoted at its 'lower' end and having shifting devices at its 'upper' end but I understand these words lower and upper to be merely designatory and used because in the location shown it is the lower and upper ends of the device which are referred to, though if the device were differently located these words might have to be transposed to be literally accurate. If the patentee had used the

words receiving and delivery, such transposition would not be necessary. I am also aware that in the claim the device is called an elevator, and this is correct, but, perhaps, slightly misleading, as whatever its position in a machine of the class illustrated in the patent it assists in elevating the grain from the point H to the point P, even though it were so located that it acted on the grain only on the downward portion of its path.

"Turning to the defendant's binder, I find it to be a machine in which the grain falls on to a carrier platform and is carried from it or elevated to the binding devices, which are located at a higher level on the other side of the driving wheel.

"The elevator or conveyor in this defendant's machine, which conveys the grain from the carrier platform to the binder, is composed partly of two endless canvases, between which the grain is conveyed to the highest part of the travel, and partly of tooth-arms which convey the grain forward to the binders, the latter being located in the downward portion of the path of the grain. Combined with this dual conveyor is a swinging conveyor of the same identical construction as that shown in the Olin patent—that is to say, it is composed of an endless belt moving on pulleys and so arranged as to act on the butts of the grain and convey them forward in their path to the binder, and at the same time push the straws endwise so as to bring them to the proper point to be bound centrally. This swinging conveyor in the defendant's machine is pivoted at its receiving end and its delivery end provided with devices for shifting it to accommodate grain of different lengths. The function, operation, and purpose of this swinging conveyor in the defendant's machine are identical with those of the swinging conveyor in the Olin patent. It pushes

the straws endways so as to deliver them centrally to the binder, exactly as Olin's does. It forwards the butts on their path exactly as Olin's does. It is combined with a mechanism which elevates or conveys the grain from the carrier platform to the binder. So is Olin's. It is pivoted at its receiving end as in Olin's and its delivery end swings, as does Olin's, but the mechanism for shifting the delivery end is slightly different in the two machines. In the defendant's machine a sliding bar is used, and in the Olin a sliding bar and lever. The only differences between them are in the form of the main elevator or conveyor with which the swinging elevator is combined and in the fact that in the defendant's machine the swinging conveyor is located near the end of the path of the grain to the binder, while in the Olin it is near the beginning of that path.

"Therefore, as the defendant's machine contains all the elements of Olin's first claim combined together and operating the same way, with only such differences as do not effect their function of operation, I say that defendant's machine contains the invention set forth in the Olin patent and claimed in the first claim thereof."

Mr. Steward, who has had more than twenty-five years' experience in the art to which the Olin invention relates, after describing the construction of the mechanism employed by Olin, on page 156 of the record said:

"By this construction, Olin provides a conveyor which may act as an elevator to carry the grain over the supporting wheel, and at the same time depress the swath and deliver it well into the binding receptacle. I treat this device both as a conveyor and as an elevator—a conveyor because it carries the grain from one point to another; an elevator, because the place to which it is carried is higher than that from which it is moved. In

the sense of the Olin patent, and in the light of the art, these terms are strictly synonomous.

"I do not wish to be understood as saying, that specific construction or devices do not exist in the art in which it is not proper to distinguish between a conveyor and an elevator. I think I am borne out in my broader statement by the fact, as I consider it to be a fact, established in my mind by long experience, that it is totally inessential to the operation of the Olin device, whether the mechanism for moving the grain which be considered, or is in fact, something carries the grain upward, or carries it downward, or moves it horizontally: But one thing is essential; that the grain operated upon by the belt Q must be in a moving, or, as Olin puts it, a flowing condition while operated upon by the belt.....

"As placed in the Olin machine, the belt is pivoted at its lower end. This is simply because it is placed upon such a part of the conveying mechanism that the receiving end is lower. As I have stated, it is immaterial which end is lower, but one thing must not be forgotten, namely, in order to be operative at all—in order to be somemore than an inert mass of machinery—the device must be pivoted at its receiving end. Olin uses the word lower—as shown, it is the lower, but it is also the receiving end. Hinged at its delivery end the device would be inoperative, because, with the delivery end in a fixed position, the position of the straw relative to the receptacle could not be controlled or adjusted. As this matter has been overlooked by Mr. Renwick, and as much dust has been stirred up which tends to obscure it, I will dwell somewhat upon it.

"Olin's adjustable belt Q is a device by which the direction of the travel of the swath of grain

is controlled. If left in one position, the swath travels in a straight line, as in long grain, from the farthest end of the receiving platform to the binder receptacle. If the operator wishes to deliver his swath to another position, to give it another course, another line of travel, he moves the belt Q. I can liken this to the means by which railroad trains are given different directions of travel; if an ordinary three-way switch is left in one position, the train passes straight ahead; if moved one space, the train is given a different direction; if moved still farther, the the train will be carried farther to the right or the left as the case may be. Olin's device I consider to be one, that, among other things, renders it possible for the operator to switch the swath of grain on to any track he pleases for the purpose of central binding."

Again on page 161 of the record, Mr. Steward says:

"Olin does say that his belt Q is pivoted at the lower end. Unaccompanied by any other assertion, this is not a limitation. For illustration, the door which enters this room, is a plane of wood of certain dimensions, pivoted at one of its vertical edges by certain contrivances known as hinges, said hinges being upon the left hand side; upon the right hand side is a knob for operating a latch. In another wall of this room is a plane of similar dimensions made of wood, with hinges identical, and with a latch and knob, but the hinges are on the right side and the knob on the left; if the first of these things is a door, the second is a door, absolutely a door, notwithstanding the fact that there is an exact reversal of the position of the hinges. Renwick might just as well say that there is a difference between these two doors as that that there is a difference between Olin's device, which is in fact hinged on the grain side, and defendant's device which is

> hinged on the stubble side. Certain functions are performed by Olin's part Q because it is an 'elevator,' as he shows. I say, more properly, conveyor. Other functions are performed because it is a belt, a moving plain surface made to have aggressive contact with the butts of the grain. Olin speaks repeatedly of this as a belt, calls it an elevator or belt, and nowhere limits himself to it as an elevator."

The testimony of Mr. Whitney, a man of large experience in the art to which the Olin invention relates, is to the same purport. His consideration of the Olin patent begins at page 251 of the record and we refer to it so that the Court may pursue it further if desired. But if the complainant's contention as to the proper construction of the Olin patent be accepted, there can be no question as to the infringement by the defendants, and we deem it unnecessary to quote at length from the testimony of Mr. Whitney.

The art prior to the Olin invention shows nothing which, as it seems to us, can be considered as affecting the validity of the Olin patent. The Court below referred to but four patents. These will be found mentioned in his opinion at page 66 of the record. We will consider them in the order mentioned by the Court and quote from the testimony in relation to them.

The first patent mentioned by the Court is the Elward patent of 1875, No. 165316, found at page 457 of the record. This patent shows a little endless canvas marked G arranged immediately at the foot of the inclined elevator on the inner shoe which projects forward. It is shown in the sketch opposite page 167 of the record divested from the complicated mechanism illustrated in the patent. The canvas G is not *adjustable* at its delivery end. It is not a *swinging* butt adjuster. It does not drive the grain but the grain is supposed to drive it. The

Elward patent on page 458 of the record says that the apron or canvas may be operated by the *friction* of the passing butts of the grain or may have a positive movement imparted to it by mechanism. In either case, however, it is not a *pivoted* swinging butt adjuster. It is not capable of performing the functions or producing the result of the moving, pivoted, swinging butt adjuster of the Olin patent or of the defendant's machine. The patent shows no mechanism for causing the canvas G to travel but merely suggests that mechanism may be used.

Mr. Steward, in speaking of the Elward patent, beginning on page 167 of the record, says:

> "Patent to Elward, No. 165316 is introduced. It seems to me that Mr. Renwick makes all of the capital out of this device that can be made, and attempts to make a great deal more, as I will endeavor to show. The belt which he has lettered G he considers the equivalent of Olin's belt Q. Now, in order to be such, it must perform substantially the same offices in substantially the same manner.
>
> "It should advance the butts; in fact it can but retard them. To be operative, as a device for advancing the butts, it must be moved with a positive force. As a matter of fact, the adjusting belt on defendant's machine, is absolutely inoperative unless it is kept so tight upon its driving drums that they shall always move it. Unless exceedingly tight the canvas is not moved with force enough to carry the butts of the straw, and the said canvas becomes an obstruction. In that event the grain is wheeled by said resistance and pitches head-first into the receptacle. This is a matter of practical knowledge, as I must have encountered it many hundred times. Judging from analogy, Elward's device could but do the same thing. I have introduced a sketch No. 3 [opposite page 167 of the record] which shows

the effect that this would necessarily have upon the grain. I am aware that Elward says that this canvas may be rotated, but he does not say *how*. If it were positively rotated it would still be incompetent to perform the offices of Olin's belt Q because it is not adjustable at its delivery end, and hence, could not give direction to the swath.....

"Now, comparing the operation of Elward's device with Olin's device, I do not consider it a limitation because Elward's canvas belt G is far from being Olin's canvas Q. In fact, so far that it does not perform any one of the functions of Olin's device. On the contrary it tends to produce results diametrically opposite from those obtained by Olin. For instance, Elward's belt retards the butts. Olin's device advances them. Elward's renders the straw more oblique. Olin's produces parallelism. Elward's device but wheels the straws so that their butts may enter the elevator. Olin's device shoves them headward. Olin's device is adjustable for a purpose. Elward's device is not adjustable at all."

The defendant's expert seems to have been under a misapprehension as to the proceedings of the Patent Office in procuring the Olin patent. He seems to consider that the Elward patent now under consideration was referred to by the Office and that Olin amended or conformed his claims to evade the Elward patent which he has cited. As a matter of fact, an examination of the proceedings of the office, beginning at page 381 of the record will show that the Elward patent now under consideration *was not referred to at all.* Some additional claims Nos. 8 and 9 were struck out in view of a reference to *another* Elward patent of a different number and date, upon a different subject matter from that now under consideration.

Mr. Whitney, who also testified as an expert on the part of the complainant, considered this Elward patent, beginning on page 252 of the record. We do not deem it necessary to quote at length from his deposition, but refer to it in case the Court may desire to read it. He fully corroborates Mr Steward in all that he said as to the differences between the Elward patent and the Olin patent in suit.

The next patent, referred to by the Court below, was the Green 1877 patent No. 188125, found at page 525 of the record. This patent shows a board arranged on its edge, pivoted at the bottom and capable of being moved fore and aft at its upper end. It has no canvas on it whatever and can operate only as a *retarding* device to to the extent of the friction between the butts of the grain and the surface of the board. Mr. Steward has introduced a cut or sketch showing the Green arrangement which will be found opposite page 166 of the record. In considering the Green patent, Mr. Steward on page 166 of the record said:

> "A reference to the Green patent will show that he has a board pivoted at the foot of the elevator and adapted to be swung at its upper end by means of a small peg-like handle, with no means whatever for holding it in any position of adjustment, while the model shows exactly defendant's form of Olin's adjustment device. Regarding the operation of Green's invention, I can but say that it is not necessary for me to regard what the inventor intended to do with it, as a matter of fact, it can by no possibility so operate as to perform the offices of Olin's invention. On the contrary, it is a retarding device. It tends to prevent the adjustment of the grain, and I do not see how a device, though it may be an attempt to perform a certain act, if it performs directly the opposite things, can be considered as anticipation of mechanism which faultlessly ac-

complished the thing aimed at. Sketch 2, already introduced, well illustrates the effect produced on the butts of the grain in retarding them, so well, it seems to me, that words are not necessary.

.....

"How can a mere stationary board, whether rough or smooth, act in any other way than to retard, if swung to a position not exactly in line with the normal course of grain travel. It seems clear to me that instead of being a limitation on the Olin patent, the Green device should but compel a higher estimate of Olin's success, and of the value of his invention. Renwick says, Green's board acts upon the grain to shove it endwise.' This is simply impossible; the board retarding the butts would but wheel the straws, 'right into line' following each other endwise in case of short grain, and badly enough so, in long grain, as shown in the sketch."

Mr. Whitney in considering the Green patent beginning on page 251 of the record said:

"In regard to this device, resembling, or anticipating the Olin patent above mentioned, I would consider it a failure in every respect. In devices for moving and adjusting grain in its flow to a binder, it is found, by experience and practice, quite essential that the surface of such an adjuster which comes in contact with the grain should be not only a moving surface, but should travel faster than the flow of the grain with which it comes in contact. The device as shown in the Green patent being a swinging board, only would act as a retarder, and when brought against the butts of the grain would tend to hold the butts back, thereby letting the heads of the grain gain upon the butts and making the delivery in worse condition with such a device than with none at all. In fact, it has been found by

actual experience in the field, that such a device answers no purpose for an adjuster. Having operated considerably with it myself, I feel satisfied to assert this as a fact."

The Court next refers to the Watson & Renwick 1853 patent No. 9930, found at page 496 of the record. This patent simply shows a main elevator provided with an under and an upper canvas or belts between which the grain is carried by frictional contact. Means are provided for shifting the upper ends of the upper series of belts to direct the stream of grain more or less fore or aft as may be necessary to secure central binding. It does not operate on the butts of the grain, nor accelerate their movements. It has nothing whatever corresponding to the supplementary conveyor of the Olin patent. Mr. Steward, beginning on page 159 of the record, considering this patent says:

"In the patent to Watson & Renwick is shown a grain harvester and automatic binder. As in the Olin machine, the grain is conveyed in the form of a continuous swath. A series of belts form the elevator, and, by means of a longitudinal movement of the uppermost roller, or rather, the shaft which carries them, the delivery ends of these belts are adjustable more or less rearward, to deliver the grain centrally on to a table. This patent provides for delivery for central binding, but that is all that it does provide. Nothing is shown or described for pushing the individual straws forming the swath headward by actual contact with the butts, and thus evening up the butts, and bringing them uniformly into line. No means are shown for hastening the butts, in order to bring them parallel with the heads. A main elevator is shown —it is the only elevator—only device for conveying the grain to the binder. This patent can in no

way limit Mr. Olin, because all of his claims involve combinations of parts, that do shift, relative to the conveyor."

The next patent referred to by the Court is the Marsh 1864 patent No. 41080, found at page 491 of the record. This patent merely shows an ordinary grain elevator and a belt arranged at its front edge on *horizontal* rollers to accelerate the advance of the butts. This belt is not arranged on *vertical* drums or rollers as in the Olin patent, is not pivoted at its *receiving* end, is not *shiftable* fore and aft at its *delivery* end, is not capable of *directing* the stream of grain for central binding, and is powerless to move the grain *endwise* to even the butts. It wholly fails to show or to suggest the Olin device under consideration. The present complainant was building the Marsh harvester and Olin, then in his employ, sought to accomplish something that the Marsh device was incompetent to do and complainant adopted it.

These are all of the patents referred to by the Court or upon which he laid any stress as appears from his opinion.

In conclusion, we submit and insist that the proper construction to be given to the Olin patent is one which will cover the arrangement of a butt adjuster provided with a *traveling* canvas to *aggressively* engage the butts of the grain, interposed *between* the point where the grain is delivered to the elevating mechanism and the point where it is to be bound, pivoted at its *receiving* end and *movable* or adjustable at its *delivery* end, to enable the operator of the machine to change the angle of the inclination of the swath at will, whereby the butts of the straws are *brought up even* with the heads. individual straws moved *endwise* to produce a flat-bottomed bundle and the *course* of the stream of grain *changed* as may be necessary to insure central binding. *No patent in the prior art shows such a butt adjuster.* There is nothing

in the prior art which requires Olin to be limited to a butt adjuster that is literally pivoted at its *lower* end and adjustable at its *upper* end. Nor is there anything in the patent itself to require such limitation further than the use of the words lower, upper, etc. These terms however should be regarded merely as *relative* terms intended to designate the *receiving* and the *delivery* ends of the butt adjuster. They should be considered the same as if he had shown his butt adjuster with its receiving end directed toward one point of the compass and its delivery end toward another, and had said that the adjuster was to be pivoted at its *North* end and was to be adjustable at its *South* end. These terms, like the terms used in the patent, do not affect the *function* of the device and are mere terms of *convenience* used to describe the mechanism delineated in the drawings without operating as limitations to such mechanism. If these views be accepted by the Court, the decision below must be reversed with instructions to the Court to enter a decree in favor of the appellant.

## THE STEWARD 1883 PATENT.

The other patent involved in this appeal is that of John F. Steward No. 272598, issued February 23, 1883. The appellees are charged with infringing the 20th and 21st claims which read as follows:

> "20. The combination, in a grain binder, of moving butt adjusting mechanism, and the board $d^1$, substantially as described.
>
> "21. The combination of the swinging butt adjuster, the arms $d^2$, $d^3$, and $d^4$, and the board $d^1$, pivoted to the swinging butt-adjuster, substantially as described."

The object of these claims is to cover combinations of devices to operate more particularly in connection with mechanism for advancing and adjusting the butts of the

grain, as heretofore considered in reference to the Olin patent, so as to more perfectly secure the evening of the butts and the central binding of the gavels. In other words, their particular office might be defined to be the *retaining* the gavel in the condition in which it is brought up and delivered by the Olin traveling butt advancing and adjusting mechanism until it is bound.

As the grain advances into the binding receptacle the board $d^1$ bears against the butts and holds them in an even condition and in such position as to insure the central binding of the bundle. The arrangement of the parts described in the 21st claim is such as to form what may be termed a jointed parallelogram so that the board $d^1$ is acted upon and moved as the operator modifies the position of the butt adjuster and changes its angle so as always to insure its directing the grain into the binding receptacle in the best position.

The machine of the Winona Co. claimed to infringe the 20th and 21st claims of the Steward patent, is providded with a moving butt adjusting mechanism, identical in its construction and operation with that of the Steward patent. It is also provided with a board pivoted to the lower end of the butt adjuster to retain the butts of the grain in proper position. In fact, so far as the 20th claim is concerned, the Winona machine appears to have been copied from the patent under consideration. As to the 21st claim which calls for parts constituting a parallelogram, the infringement is as real, though perhaps not quite so apparent at a glance. As before said, the Winona machine contains the swinging butt adjuster and a pivoted board at its lower end. The parts $d^2$, $d^3$ and $d^4$ are found respectively in the piece of round iron, the top or the ridge of the machine, and the flat bar iron lever. The operation of these parts in their respective positions corresponds to the operation of the analogous parts in the combination secured in the Steward 21st claim. In discussing the question of infringement by the Winona Co.,

the complainant's expert, Mr. Bates, on pages 30-32 of the record said:

"In my opinion, the defendant's binder does contain the combinations set forth in the Steward patent, 272598, and claimed in the 20th and 21st claims thereof. My reasons for this opinion are as follows:

"The 20th claim of the Steward patent is in the following words: 'The combination, in a grain binder, of moving butt adjusting mechanism, and the board $d^1$, substantially as described.'

"As set forth in the patent, the moving butt adjusting mechanism consists of an endless belt moving on pulleys set in a frame at right angles to that portion of the machine over which the grain is passing when acted upon by this device. Its object, as I understand it, is to act upon the butts of the grain so as to move short grain backwards and deliver it centrally to the binder, and also to convey the butts forward in their path, so that they will keep pace with the heads. One end of this device is pivoted to the machine and the other end is capable of swinging to adjust the device to grain of different lengths; to the swinging end of this moving butt adjuster is pivoted a board marked $d^1$, the purpose of which is to prevent the grain forming a gavel from working or jarring forward whilst the gavel is accumulating. It is the combination of these two devices, to-wit, the moving butt adjuster and the stationary butt retainer, or board $d^1$, which constitutes the combination of the 20th claim.

"Turning to the Winona machine, I find in it a moving butt adjusting mechanism of the identical construction and operation of that in the Steward patent. Pivoted to the end of this butt adjuster in the Winona machine is a board which constitutes a butt retainer. and prevents the grain forming a gavel from working or jarring forward

whilst the gavel is accumulating. These two parts in the Winona machine are of the same identical form and construction as in the Steward patent and are combined together in the same way. In fact, the identity is such as to suggest that the Winona machine was constructed from the Steward drawing, or *vice versa*.

"For these reasons, I say that the Winona machine contains the Steward invention as defined in the 20th claim of his patent 272598.

"The 21st claim of the Steward patent is in the following words: 'The combination of the swinging butt adjuster, the arms $d^2$, $d^3$, and $d^4$, and the board $d^1$, pivoted to the swinging butt adjuster, substantially as described.'

"I have just explained the swinging butt adjuster and the board $d^1$, in speaking of the 20th claim. The arms $d^2$, $d^3$ and $d^4$, together with the frame of the swinging adjuster, constitute a parallelogram whose function is to keep the board $d^1$ parallel to the edge of the chute, or at right angles to the gavel, whatever its position may be; to this end, the arm $d^2$ is secured to the board $d^1$, so that the two are as one piece; the arm $d^3$ is rigid, or as one piece with the machine, the arm $d^4$ with the frame d of the butt adjuster, joins said parts $d^2$ and $d^3$, so that these remain parallel, and thus all positions of the board $d^1$ are parallel to each other and at right angles to the gavel.

"In the Winona machine, there are, as already explained, the swinging butt adjuster and the board corresponding to $d^1$; there is also in the Winona machine a parallelogram which retains the board parallel in all its positions and at right angles to the gavel; this parallelogram in the Winona machine is composed of the frame of the butt adjuster, the top or ridge of the machine which corresponds to Steward's $d^3$, a lever composed of flat bar iron which corresponds to

Steward's $d^4$, and a piece of round bar iron which corresponds to Steward's $d^2$; this latter is connected to the butt retaining board, so that the two are as one piece and the detaining board is kept in its proper position. This round bar in the Winona machine is passed through two eyes on the machine for some reason, probably to overcome the effect of the bend at the end of the bar. These eyes are not necessary to the operation of the device. It would operate better without them, especially if the rod were straight, and if they were omitted the butt retaining board would keep its position at right angles to the gavel by reason of the parallelogram exactly as it does in the Steward patent.

"Therefore, as I find in the Winona machine, a swinging butt adjuster, a butt retaining board pivoted to it, and parts forming a parallelogram and corresponding exactly to Steward's arms $d^2$, $d^3$ and $d^4$, I say that the Winona machine contains Steward's invention as set out in the 21st claim of this patent No. 272598."

Mr. Steward, the patentee, also testifies on the question of infringement of the 20th and 21st claims. His testimony will be found beginning near the bottom of page 222 of the record and is as follows:

"The claims which the Winona Harvester Works are charged with infringing are the 20th and 21st; the former of which reads: 'The combination, in a grain binder, of moving butt adjusting mechanism, and the board $d^1$, substantially as described.'

"This is a combination of two elements. The 'moving butt adjusting mechanism' of the patent is shown to be exactly the same as that found on defendant's machine. The board $d^1$ of the claim of the patent, is one so placed as to have its plane always parallel with the sides of the

binder table, regardless of its fore and aft position, and regardless of the position to which the butt adjuster may be swung. It is further, a board which shall retain a certain relative position to the delivery end of the butt adjuster so as to receive the grain therefrom and to prevent it from jarring forward of the position to which it has been carried by the said butt adjuster. Both of these elements are found on the Winona machine, and were I to describe them I could find no words better fitting them than the words I have quoted from the patent. I can resort to no argument to show that the devices are similar, because of the fact that they are absolutely identical.

"The 21st claim covers the same combination of elements, supplemented by certain other elements which operate to preserve the parallelism of the butter extension $d^1$ with the sides of the table, and yet permit it to be carried by the frame of the adjuster to which it is pivoted. The said supplemental elements consist of certain pieces which constitute a parallelogram in effect....

.....

"Turning to the Winona machine, the frame of the harvester at the top is one of the wide bars of the parallel ruler. The round iron rod attached to the lower end of the butt adjuster is equivalent to the other wide bar of the parallel ruler. The adjuster frame and the lever by means of which the adjuster is moved, constitute the brass connecting pieces of the parallel rule. If I am right, this does not differ from the patent sued on, because all of the elements perform exactly the same office as they do in the patent. It can not be considered that the rod which is attached to the lower end of the adjuster is anything more than a part of the parallelogram which I have mentioned, although it seems to

slide through guides, because I have taken the said guides off and find that the device is as operative as before. A slot is found in the lower end of the lever, but this need lead to no confusion because it is unnecessary; a round hole will perform the same function. This is evident, because as I move the adjuster to and fro, the end of the rod hooked into it never leaves the lower end of the slot.

"As the said slot performs no office, and as the said guides perform no office whatever, the part cannot either simply or jointly be considered to be devices, or elements, or changes in construction, whereby the said 21st claim is evaded—I mean by this, that in order to evade the 21st claim, parts must be substituted which perform the office differently, and the general result obtained must be a different one. If the slot in the lever is useless, and the guides useless, neither cuts any figure, because the device with or without them is operative in exactly the same manner as provided for in the 21st claim."

We have thus quoted from the evidence of the expert witnesses so as to place their testimony in convenient shape for consideration should it be desired to refer to it. An inspection of the Winona machine, however, will make the question of infringement so plain that we think it cannot be successfully disputed on the part of the appellees. The Court below seemed to consider that there was no question that the defendants infringed. In his opinion on page 74 of the record, after quoting the 20th and 21st claims, the Court said:

"The Winona Company undoubtedly use the mechanism, operating in the same manner, as described in the Steward specification and claims. The only difference between the butt adjuster in the defendant McCormick machine and the Winona is the attachment $d^1$. The arms, $d^2$, $d^3$, and $d^4$,

with the frame, D, when operated, move like a parallel rule, and constitute a parallelogram; thus keeping the board attachment, $d^1$, parallel to the edge of the chute."

The defendants have offered no testimony controverting the views of Mr. Bates and Mr. Steward on the question of infringement. Indeed, as before said, an examination of the Winona machine with the patent open before the Court would appear to be conclusive on this question.

In order to meet the 20th and 21st claims of the Steward patent under consideration, the defendants have introduced patents and evidence upon alleged prior uses. We will consider the evidence in relation to the uses first, and then examine the various patents offered in evidence. The only defense mentioned in the opinion of the Court below against the 20th and 21st claims of the Steward 1883 patent is what is known in the record as the Heller use.

Gottlieb Heller, a German farmer living near Hope, Dickinson Co., Kansas, was introduced by the defendants to prove a prior use. He testified that in 1878 he bought a Beloit machine from Rubens Bros. who at that time were agents for the Beloit Co., but whose agency was given to him the year following, which had a butt adjuster in all respects like that claimed in the 20th and 21st claims of the patent, except that it had no construction corresponding to $d^1$ of the claim. He says that he found that when the grain was short and thin the butts of the bundle were not good and that he extended the adjuster so as to keep the straw of the bundle even at the butts. The extension, as he explains it, was first made with a piece of tin or sheet iron *nailed* on to the frame of the butt adjuster, which arrangement he says proved unsatisfactory. He then says he made an extension out of sheet iron and heavy hoop iron which would adjust and keep straight

with the butts of the bundles. (Record 307, Ans. to Q. 8.)

This second extension, which is the only one that can be considered as relative, is illustrated in sketch 22 opposite page 216 of the record. Sketch 22 is a copy of a sketch made and produced by Heller himself at the time of his first examination, and therefore correctly represents what he claimed to have made.

Defendants' counsel asked him if he had in his "possession here the *identical* device comprising the butt adjuster and the extension which you added to it that you used on your farm in the harvest of the year 1878." (Record 308, Q. 18), and Heller replied "I here produce it." This device which Heller produced and swore was the *identical* one that he made in 1878, and which defendants claim anticipated the 20th and 21st claims of the Steward patent, was offered in evidence as "Defendant's exhibit Heller butt adjuster with adjustable extension parts 1 and 2." Heller testified that he used the extension which was offered in evidence, in the harvest of 1878 and cut and bound a good many acres with that thing on but I can't say how many." He says that his wife and son helped him in the harvest and drove the machine. He says that he "had never had any experience with harvesting machines of any kind before 1878," except a self-rake, and "never had any before that time with a machine in which it was necessary to keep the butts of the grain even for binding." (Record 314, Ans. to XQ. 54 )

He says that he attempted to use the butter and extension in 1879, but that the binder was incapable of doing satisfactory work "owing to the shortness of the grain that season," so he took them off along with the binder. That it did not work in short grain is evidence that it was inoperative, for, the device of the patent can only show its operativeness in short grain, grain long enough to be cut can be handled by the patented device, only. (Record 314, Ans. to XQ. 86.). He says that he afterwards made another for a new binder that he

afterwards bought which was *stiff* instead of being pivoted to the butt adjuster.(Record 315, Ans. to XQ. 96.) He says that he put this *stiff* kind of an extension on some other machines "maybe four or six." (Record 315, Ans. to XQ. 102.) The butt adjuster represented in sketch 22, the one relied on to establish the prior use, was thrown aside and *lost sight of for several years* until the exigency of this litigation brought it to light. (Record 317-18, Ans. to XQ. 123-124.) Heller never applied for any patent or took any steps towards securing an introduction of the device. He, however, made an application in April, 1883, for something else, which the testimony shows was a hopper.

Mr. Rubin was called to testify that he sold Heller a Beloit Harvester & Binder in 1878. He testified that he saw an extension on Heller's machine but was not *positive* as to its *construction*. (Defendants' record, Ans. to Q. 15.)

George Heller, son of Gottlieb Heller, was examined and testified that his father made an extension like the one introduced by him for the harvest of 1878 and that the sheet iron piece was from "a piece of our old Kirby self-rake." (Record 331, Ans. to Q. 14.) His recollection is not very clear as to *how* the construction was attached to the butt adjuster. He says that his father "afterwards put a stiff one on that second binder we got." (Record 333, Ans. to Q. 33). The defendants, apparently not being satisfied with the results of their former efforts, afterwards took additional testimony, recalling the witnesses that had already been examined with additional ones. One of the additional witnesses was Gothilf Schlesener who testified that he saw an adjuster on Mr. Heller's machine in 1878 and 1879. He says the extension board was put on *with little hinges*. He testified without having the exhibit produced by Mr. Heller before him and with nothing to refresh or assist his recollection. As we shall presently see, he qualified and virtually withdrew his corroboration of Heller. Rosina Heller, the wife of Gottlieb

Heller, was called by the defendant's and testified that she ran his harvester and binder in the harvest of 1878. Being shown "the defendants' exhibit Heller butt adjuster with adjustable extension," she said that she saw it in 1878 and that it was on a machine in that year.

Gottlieb Heller, on being recalled by the defendants, said that his butt adjuster extension was only used *about half a day* in the harvest of 1879. (Record

The defendants' evidence, standing by itself, when thoroughly examined, is not as we submit sufficient to make a prior use that can operate to defeat the 20th and 21st claims of the Steward patent. From the testimony of Gottlieb Heller, the principal witness, it appears that the extension was *abandoned* after the first season's experiment with it; that another one was made and applied to his new binder in the summer of 1880, in which the idea of *pivoting* the extension to the butt adjuster was *discarded* and a *stiff* one used; that adjuster with its extension that he claims to have made in 1878 *passed out of sight and was forgotten* for a number of years. Taking all the evidence together, there is no substantial agreement between the witnesses as to the construction and operation of the 1878 device. At most, it only amounts to an unsuccessful and abandoned experiment, and the rule as to such experiments has become practically elementary. It has been so often held that crude and imperfect experiments, equivocal in their results and then given up for years, cannot be permitted to prevail against an original inventor who has perfected his improvement and obtained his patent, that we deem it unnecessary to burden our brief with authorities.

If there were nothing in the record in reference to the Heller butt adjuster except the evidence that the defendant's themselves produced, we should confidently urge its insufficiency and unreliable character; but when the complainant came to cross-examine and take evidence to meet this alleged prior use on the part of Heller, so many

significant circumstances and contradictory facts were brought to light that it is impossible for the history of Heller's operations to effect either the validity or the scope of the claims in question. We will present these discrediting facts and circumstances in their order, with a brief reference to the evidence from time to time as may be deemed necessary.

1. Heller was interested in defeating the Steward patent. As appears from his testimony, he was at that time agent for the Milwaukee Harvester Co. This Company was making a butt adjuster like that claimed in the 20th and 21st claims of the Steward patent. They were infringing those claims. They and their agents were interested in defeating them. At the time Heller's deposition was taken, Mr. Stout, a patent lawyer from Milwaukee, was present, and it was admitted on the record that he and his firm were the attorneys of the Milwaukee Harvester Co. in an application which that Company had made for Mr. Heller. Although he claimed that he was there in Kansas with Mr. Dyrenforth as an attorney of the Winona Harvester Works, we submit that it is impossible to read the proceedings without the conviction that he was there in the interest of the Milwaukee Harvester Co. Heller admits that Mr. Schulte, the superintendent of the Milwaukee Harvester Co., was the person who wrote to him in reference to looking up his old devices and that he sent the particular pieces introduced in evidence to Mr. Schulte before they were produced at the examination in Kansas. It thus appears that the Milwaukee Harvester Co. for whom Mr. Heller was acting as agent was interested in defeating the claims under consideration and took an active part in securing Heller's testimony. The fact that Heller in behalf of his Company was interested in defeating the Steward patent certainly detracts from the credence and weight that in the absence of such interest might be given to his testimony.

2. It appears that Heller received very substantial

consideration as compensation for his testimony. Govnor Teats, a lawyer residing at Hope, Kansas, testified to a conversation between himself and Heller in which Heller stated to him that he got a new buggy "for his evidence in the Harvesting Machine case." That the testimony on this point may be fully before the Court, we will quote Mr. Teat's deposition. On page 122 of the record Mr. Teats said:

"In July or August. 1887, Mr. Heller rode into Hope with a new buggy. I was complimenting him on his new buggy, and he made the remark —Yes I got that for my evidence in the Harvesting Machine case. At a later date, while at his place he again reiterated the statement, and said that he might have got more if he had been a little sharper. He stated that he got an order for a machine on Berry Bros., at Abilene, but that as he had machines enough he made a trade with them for the buggy and a wind-mill."

On cross-examination Mr. Teats was asked:

"R. X. Q. 62. Now, did not Mr. Heller tell you that he had received this buggy and wind-mill for the work in obtaining evidence in this case, or is not that the impression that he conveyed to your mind? A. No. sir.

"R. X. Q. 63. Do you mean to say that Mr. Heller gave you the impression that he was paid for giving testimony that was false. A. Yes, sir; and also for keeping quiet as to the spring-board at the bottom of the deck; that is the impression that was made on my mind at the time.

"R. X. Q. 64. Now give the exact language that Mr. Heller used that gave you that impression. A. I have given it in my answer before; it is, I think, almost verbatim, as follows:—Yes, I got that buggy for my evidence in the harvesting machine suit or case. This was expressed to me in front of the Bank at Hope, on the side-walk, in my first conversation with Mr. Heller,

and while at his farm he was demonstrating the working of the binder and said that he put on the drop-deck the same time he made the extension to the butter, but that he was not to say anything about that."

The significance of Heller's statement that he was to *keep quiet* as to the "spring-board at the bottom of the deck" will be understood and appreciated when it is known, and the fact is brought out in the record at page 244, that the Milwaukee Harvester Co. had a patent, procured long after Heller's operations, that would be invalidated by testimony of the spring-board at the bottom of the deck. On this same page of the record it appears that the Milwaukee Harvester Co. had Mr. Stout, their attorney present at the examination. Heller therefore appears to have been acting under the instructions of his employers to *disclose* certain facts, to defeat claims that they were infringing, and to *conceal* certain facts that might impeach the title to a patent which they themselves owned. While bringing out of Heller those facts which the defendants thought they could use *against* the complainant, they were careful to enforce *silence* as to the balance of his operations. What weight can be given to the testimony of a man who could thus be manipulated in the interests of the defendants, or others standing in a like position of infringement?

Mr. Whitney, on behalf of the complainant, visited Heller in the latter part of March, 1888, and had various conversations with him about the operations to which he testified. and Heller stated to Mr. Whitney substantially the same thing that he before stated to Mr. Teats in ref- to his compensation. Mr. Whitney on page 291 of the record testified in reference to statements by Heller to him:

"He stated further to me, during my various conversations with him, that he did not think he got well paid for his testimony. He said to me,

'I got an order for a self-binding machine, but I did not take the self-binder, I took a wind-mill and a buggy in place of the binder. I might have got more if I knew the thing was of so much importance.' "

Does this look as if the amount he received was merely for work done and payment for time while testifying?

Not a word of testimony has been taken by the defendants to contradict or explain the facts testified to by Mr. Teats and Mr. Whitney. The evidence in the record is unimpaired that Heller according to his own statement had received an order for a self-binder from the defendants "for my evidence" in the Harvesting Machine suit, which order he had converted into a buggy and a wind-mill. Not only that, but he appears to have claimed that he could have got more for his testimony "if he had been a little sharper!" Furthermore, it appears that while *disclosing* some facts he was *concealing* others and that both the disclosure and the concealment were in the interest of his employers. Testimony tainted by such circumstances as these has never, we believe, been accorded controlling weight in establishing a prior use. Rights of property would be exposed too much to danger if they could be sworn away by the testimony of men who sell their evidence as Heller appears to have done in this case. Particularly suggestive is the fact that he made both what he *said* and what he *concealed* the subject of remuneration. The Courts have always looked with suspicion upon testimony of this character.

In *Cluett v. Claflin*, 30 Fed. Rep. 923, Judge Coxe said:

> "The character of one of these witnesses, Ford, was compromised by an attempt upon his part to sell the knowledge he possessed for a large sum of money."

In *Graham v. Plano Co.*, 33 Fed. Rep. 920, Judge Blodgett said:

"Mr. Preston does not, I must say, stand in the best light before the Court, as a witness, as the proof certainly tends to show that he attempted at least to dispose of his testimony to the highest bidder in the case."

3. The evidence of the wife and son of Heller is scarcely to be regarded in any better light than his own. Aside from the natural disposition that they would have to agree with and corroborate him and acquiesce in his recollection of facts, there would exist the same material interest to bias and prejudice their testimony. If he were driving a bargain, it would be preposterous to expect his wife and son to take position in their testimony antagonistic to his. So evident was their disposition to to agree with him that they followed him into a number of unnecessary errors, as we shall presently show. In a word, their testimony seems to have been cut and fashioned upon the pattern of his. We think that so far as Mrs. Heller and George Heller's testimony is concerned it operates rather to weaken than to strengthen that of Gottlieb Heller.

4. If Heller made the butt adjuster as he claims, and of which the one introduced in evidence was identified by him as being the identical structure that he made and used in 1878, it becomes a subject of interest in testing the strength of his testimony to inquire *where* and *from what* he procured the material out of which the butt adjuster thus produced was made.

George Heller, in his first deposition, with the "Defendants' exhibit Heller butt adjuster with adjustable extension" before him, on page 331 of the record said:

"This here sheet iron extension is the one he put on in 1878, because this piece of sheet iron is a piece of our old Kirby self-rake."

Gottlieb Heller said that the only machine that he ever owned prior to 1878 was a self-rake (Record 311,

Ans. to XQ. 53). He informed Mr. Whitney, when he saw him and asked him where he got the material out of which he made the exhibit in question, that it was made from a part of his old Kirby self-rake. On this matter, beginning on page 290, Mr. Whitney testified:

> "Sometime during the latter part of March, I called upon Mr. Gottlieb Heller at his residence and put various questions to him regarding the making of the butter extension, and what he made it from, and when he made it, and he did not hesitate in telling me that he made it from his old Kirby machine. He said from the sheet iron that was on his old Kirby self-rake platform. Showing him the extension and asking him to explain how he made it, he said, I cut the sheet iron out and then made the strap iron, punching the holes both in the strap iron and the sheet iron and riveted them together. I then asked him to show me the platform of this old Kirby; he told me in answer, that it was destroyed, some pieces of the boards only remaining, but that other parts of the machine were there, such as the rake-head, some pieces of the reel, and the mower part of the machine was on his sons farm. I recognized the rake-head as the one known as the Burdick rake. This I know to have been the rake used upon the Kirby, as it was manufactured about the years 1874, '75, and '76. The machine as it was then constructed was known as the Kirby Reaper with Burdick self-rake. In answer to my questions regarding his experience with self-rakes he replied that the Kirby self-rake was the only one that he ever owned and that he had no experience in the use of any other. I then visited the residence of Mr. George Heller, son of Gottlieb Heller, and saw the mower part of the Kirby to which his father alluded, complete, and I had no difficulty in recognizing it as the mower part of an old Kirby machine. I

> then showed the exhibit Heller butter extension to Mr. Geo. Heller, asking him if he recognized it as the one his father made. Oh, yes, he said, he knew it very well, as it came from the old Kirby self-rake of which his mower was a part. He further stated, in answer to my questions, that the sheet iron, of which this butter extension was made, did not come from the mower part, but from the platform of the self-rake. Further, in answer to questions as to where they got their old Kirby self-rake, he replied that his father bought the machine in 1875 of Latner & Blakely, of Junction City, Kansas, and that this old Kirby self-rake was the only one they had ever owned and the only self-rake machine that he had ever operated with."

Mr. Teats also said that Heller told him that he made his sheet iron extension from the Kirby self-rake, his words being: "He stated that he made it out of a piece of sheet iron from his old Kirby self-rake." (Record 119, Ans. to Q. 10).

It thus appears that George Heller stated positively in his deposition that the sheet iron extension on his father's butt adjuster was made from their *old Kirby self-rake*, and Gottlieb Heller himself stated in his deposition that that was the only kind of a machine that he ever owned before he bought the machine on which he claims to have put the butt adjuster, and that he stated to Mr. Whitney and to Mr. Teats, on different occasions, that he made the sheet iron extension from the sheet iron cover of the platform of his *old Kirby self-rake.*

The evidence shows beyond any question that he did not and could not make the sheet iron extension from the covering of his old Kirby self-rake, for the reason that *it did not contain* any such sheet iron as his extension is made of. The evidence on this head is very full and we will quote from the deposition of the witnesses. Mr.

Whitney in reference to this point on page 292 of the record said:

> "Regarding the Kirby self-rake machine, from which the witness Heller says he took this piece of sheet iron from which he made the exhibit butter extension, I will say that I am sufficiently familiar with it, having had more or less experience with it for the last 25 years, and I recollect very distinctly that the sheet iron covering or platform of the old Kirby Reaper was much lighter iron in thickness and when it was painted was painted only on one side and that of a plain black color with no ornament on it. and that it contained no strap iron riveted to it."

William A. Kirby, the inventor of the Kirby Reaper and the superintendent who had charge of its construction since 1885 was called as a witness and the "Defendant's exhibit butt adjuster with adjustable extension" shown to him. He was then asked on page 287 of the record and testified as follows:

> "Q. 8. Look at this piece of sheet iron riveted to a piece of bar iron before you, marked 'Defendants' exhibit Heller butt adjuster, with adjustable extension, part 2,' and state whether there was used in the manufacture of the Kirby machine any sheet iron from which the exhibit before you could have been made. A. We never put anything of that kind on at our shop.
>
> "Q. 9. Then the sheet iron used in this exhibit could never have formed a part of the Kirby machine as you manufactured them and as you knew them? A. No.
>
> "Q. 10. I believe you have already said that the only Kirby machine that you ever knew anything about was the one which was made at the works at Auburn, with which you were connected. A. There were machines made at an early date in Indiana and Buffalo which had no sheet iron.

"R. D. Q. 25. What difference was there, if any, in the thickness or heft of the sheet iron, which was used in the manufacture of the Kirby machine and in this piece of sheet iron before you? A. The iron that we used was considerably thinner than this in the exhibit.

"R. D. Q, 26. Did you ever use any of the thickness of the piece in this exhibit? A. I never knew of any being used as thick as this.

"R. D. Q. 27. Was the sheet iron used in the Kirby machine ever painted on both sides as this piece is? A. It was not.

"R. D. Q. 28. Was it ever painted of color anyway similar to the piece before you? A. It was not."

Not a word of evidence has been introduced on the part of defendants to contradict or qualify the statements of Mr. Whitney and Mr. Kirby, that the sheet iron extension in the Heller butt adjuster never came from the Kirby self-rake, as Heller and his son stated. But not only has the complainant established the fact that the part in question *never* came from a Kirby self-rake, but he has undertaken *affirmatively* to show from what machine it did come, and has conclusively shown that it came from a machine formerly called the Triumph which Heller never owned. We will quote the testimony showing these facts so as to have it in convenient shape for consideration.

After Heller had informed Mr. Whitney that the extension was made from the sheet iron on the platform of his old Kirby self-rake, Mr. Whitney on page 291 of the record testified as follows:

"Feeling confident in my own mind, that the piece from which this butter extension was constructed was not from a part of the old Kirby machine, which Gottlieb Heller owned, or even from any other Kirby machine, I started on a

hunt for the machine which it might have come from. I visited quite a number of parties who used the Beloit binder in an early day, carrying with me the exhibit to find some party, if possible, that had used such an extension, thereby expecting to trace it to some old machine, where it might have originated. After working several weeks in this direction, I finally discovered the man who used it and the man from whose old self-rake the piece was taken. This was one Mr. Gotthilf Schlesener, a farmer of Dickinson County, Kansas, whose residence is some eight or ten miles distant from Gottlieb Heller's and the same Gotthilf Schlesener, who has testified in this case before. I will say this man Schlesener recognized the parts of this exhibit in question, both 1 and 2, when I showed them to him, without a word of query regarding them on my part. He described in detail the manner in which he constructed it and that Gottlieb Heller assisted him in making it and putting it on, and his description is already a matter of record in this case and corresponds substantially with what he then told me. Mr. Schlesener, at the time I was at his place, pointed out to me the old self-rake from which he took this piece from the butter extension, telling me at the same time that it was an old Triumph self-rake. The old Triumph self-rake which he showed me, he said was the only one, in fact the only machine, that he ever owned, before purchasing a Beloit binder. This old Triumph machine was not complete, it having been in disuse for a number of years, but a sufficient number of the parts were present to enable me to recognize it as an old Triumph self-rake. I will say here that my experience with that class of machines, not only enabled me to recognize such old parts of machines as the Triumph and Kirby, but I think I would be safe

naming any self-rake manufactured and put upon the market in the United States; more especially machines manufactured between the years 1865 up to 1880. After my discovery at Mr. Schlesener's place, to make the evidence clear in my mind that this butter extension exhibit came from a Triumph self-rake, I visited several places to find one of those old machines. Learning from Mr. Schlesener that his old Triumph self-rake had been purchased about the year 1875 at the town of Skiddy, in Kansas, a town some 25 miles from Mr. Schlesener's place, I visited that place and found in the country not far from that town one of the old Triumph Reapers, which was partly decayed, but a sufficient amount of it remained for me to recognize it as an old Triumph Reaper, and from which I obtained a corresponding piece to the one from which this butter extension was made, and I will now produce the piece which is called the sheet iron divider of the Triumph Reaper. It having been a long time since these Reapers were manufactured of this identical pattern, I find it difficult to find any of them complete, but in the old machines that I have seen there is sufficient number of pieces present to enable me to identify them as Triumph Reapers. No other machine that I have ever seen uses a sheet iron divider of this style, or any part of which this adjuster exhibit might be constructed; that is, when taken into consideration the heft of the sheet iron, and the piece of strap iron riveted thereto, and also the style of painting and shape of the same. It will be seen that on one side of this exhibit butter extension are marks indicating part of a circle. and the inside of these circle marks is an impression about 1½ inches in diameter indicating that some impression has been made by the end of a shaft. This I will say, is marks made by the grain

wheel. I have measured the grain wheel belonging to this class of machines and find it to correspond with the marks of the exhibit butter extension, and what I mean by this class of machines is the Triumph Reaper grain wheel. It is 2 feet in diameter and the end of the axle upon which it revolves is 1½ inches in diameter. It will be noticed that the axle impressions on this exhibit butter extension, also on the sheet iron divider of the Triumph Reaper, and the marks indicating part of a circle agree on each of these pieces, and they were made evidently by the grain wheel in its revolutions, when in operation, the outer rim of the grain wheel making the circular marks and the axle from which it revolved making the impression about one foot from the circle marks. I have taken particular pains to look up this matter regarding the origin of the butter extension exhibit and I am satisfied that it came from an old Triumph Reaper. The square hole in one end of the scrap iron, the painting, the outline that the scrap iron describes, the heft or quality of the sheet iron, the manner of riveting, all corresponding in this exhibit butter extension, to to the piece which I took from the old Triumph Reaper myself, I think would be sufficient to satisfy the Court that this butter extension is a part of an old Triumph Reaper.

The complainant also called Mr. L. C. Barclay who has been in the employ of D. S. Morgan & Co. in the manufacture of Triumph Reapers, and on page 285 of the record he testified:

"Q. 5. What was your particular line of duties or business while connected, or employed by D. S. Morgan and Co.? A. From May, 1868, until April, 1874, I was employed in different capacities. After April 1, 1874, I had general charge of the sale of their machines and all of

the business connected with their Chicago Office until January 1, 1888.

"Q. 6. While in charge of the sale of their machines as you explained you may state whether or not you became acquainted with the structure, in a general way, of their Triumph Reapers. A. I was thoroughly acquainted with their machine and all its parts.

"Q. 7. Look at this piece of sheet iron, riveted to a piece of bar iron, marked 'Defendants' exhibit butt adjuster with adjustable extension, part 2,' and state whether or not the Triumph machine contained any part out of which this piece before you may have been cut. A. That was cut from an exact duplicate of a piece that was attached to the outside divider of the Triumph Reaper, and was called sheet iron piece for divider."

The complainant also called Mr. Schlesener, referred to by Mr. Whitney as the owner of the Triumph machine from which the butter extension on the Heller exhibit had been made, and on page 106 of the record he testified:

"Q. 5. Look at this device now shown you marked 'Defendants' exhibit Heller butt adjuster with adjustable extension.' Look at both parts marked 1 and 2 and state whether or not these parts were shown you at the time you gave your testimony before. A. No, I did not see them.

"Q. 9. Look at this exhibit Heller butt adjuster with adjustable extension, and state who made it; if you know. A. I and Heller, we both made it.

'Q. 14. What did you make this iron piece, marked 'Defendants' exhibit butt adjuster with adjustable extension, part 2,' out of? A. I had an old Triumph self-rake and we cut it out from a piece of iron from the self-rake.

"Q. 15. You say you cut this piece out of a piece of iron that was on your old Triumph self-

rake is that correct? A. Yes that is correct."

We submit and insist that the testimony of these various witnesses conclusively establishes the fact that not only was the sheet iron extension on the Heller butt adjuster not made, as he testified, and from the machine which he said furnished the sheet iron part, but that it was made from another machine—a Triumph Reaper—that belonged to another man *living some eight or ten miles* from Heller's place. The record shows that the actual piece now called the "Heller adjuster" was never in Heller's possession until after 1882, as we shall presently see. The whole matter has been so traced down and ferreted out that were there no other objection to the weight and effect of the testimony in relation to the Heller pretended prior use than the one that we have just considered, it would prove fatal to any claim founded upon it as anticipating or invalidating the claims of the Steward patent in question. But other objections equally as fatal remain to be considered.

5. We have thus shown that Heller's statement as to the origin of the butt adjuster which he introduced is wholly unreliable and misleading. We now propose to show that his statement that he made it in 1878 *is equally false.* As a matter of fact, the particular butt adjuster which he introduced and positively identified as being the identical one that he made in 1878, *was first made in 1880 at Mr. Schlesener's* and was at that time and until after 1883 *a stiff or non-pivoted adjuster.* That is, the sheet iron was *rigidly* fastened to the frame of the butt adjuster instead of being *pivotally* attached as claimed in the Heller exhibit, and so did not contain the invention secured in the 20th and 21st claims of the Steward patent. In order that Heller's statement may be distinctly before the Court, we will quote from the record, beginning at page 308, as follows:

"Q. 18. Have you in your possession here the identical device comprising the butt adjuster and

the extension which you added to it, that you used on your farm in the harvest of 1878. If you have, please produce it. A. I have, and I here produce it.

"Q. 25. How was the sheet iron extension which you have produced fastened to the butt adjuster, which you have also produced? A. It was fastened by the bolt on the top edge and the screw on the bottom edge of the butt adjuster at the present time.

"Q. 26. What did the bolt on the top edge go through, and what did the screw on the bottom edge go through? A. The bolt went through the hole in the link or angle nearest the sheet iron, and the screw went through the hole in the flange on the lower or opposite edge of the sheet iron."

After the examination of Heller and several other witnesses, the defendants examined Gotthilf Schlesener to corroborate Heller. As we have already seen, Schlesener was also called afterwards on behalf of the complainant. At the time he was called by the defendants the Heller exhibit was not shown him and he did not see it at the time he gave his testimony. ~~His first deposition, given in the absence of the Heller exhibit and after the lapse of some years, may perhaps be considered as somewhat corroborative of Heller.~~ After complainant had investigated the matter, however, and ascertained the origin and history of the Heller exhibit, Gotthilf Schlesener was called on his behalf and the exhibit shown him. He *positively* identified it as having been made from his old Triumph machine, and testified positively as to *when* it was made and as to the *manner* of its construction. With the device before him he explicitly and positively *contradicted* the testimony of Heller. The testimony of Mr. Whitney and others that the sheet iron extension originally formed a part of an old Triumph machine, forms conclusive evidence that he is right in the statement of

his second deposition, and that Heller's statement that he made the device in 1878 *cannot* be true. We will quote at length from Mr. Schlesener's second deposition. Beginning at page 106 of the record:

"Q. 5 Look at this device now shown you marked 'Defendants' exhibit Heller butt adjuster with adjustable extension.' Look at both parts marked 1 and 2 and state whether or not these parts were shown you at the time you gave your testimony before. A. No I did not see them.

"Q. 6. I believe that testimony was given in May, 1887, was it not? A. It was last year. I am not certain about the month.

"Q. 7. And you say that when you gave your evidence last year this device, now shown you, was not shown at that time. A. No, I never saw it, so long as I got the machine on my place.

"Q. 8. You mean that you never saw it since it was on your machine until recently, is that correct? A. No, I never saw it since.

"Q. 9. Look at this exhibit Heller butt adjuster with adjustable extension, and state who made it, if you know. A. I and Heller, we both made it.

"Q. 10. Which part did you and Heller make? A. We made this iron piece.

"Q. 11. What did you do with it when you made it? A. We put it on the wooden piece.

"Q. 12. Do you mean this wooden piece, marked, 'Heller butt adjuster with adjuster extension, part 1,' here before you. A. Yes we put it on that piece.

"Q. 13. What year was it that you and Heller did this? A. 1880.

"Q. 14. What did you make this iron piece, marked 'Defendants' exhibit Heller butt adjuster with adjustable extension, part 2' out of? A. I had an old Triumph self-rake, and we cut it out from a piece of iron from the self-rake.

"Q. 15. You say you cut this piece out of a piece of iron that was on your old Triumph self-rake, is that correct? A. Yes that is correct.

"Q. 16. What was the piece of iron used for on the old Triumph self-rake? A. It was at one side of the platform to protect the gearing from the grain.

"Q. 17, How did it stand on the old Triumph machine? A. It stood up on its edge.

"Q. 18. Look at this other piece that I show you, and state if you can, what it came off of. A. It is the same kind of an iron from another machine.

"Q. 19. Coming back now to this iron piece which you and Heller made in 1880, you say you fastened it to this wooden part of the butt adjuster marked No. 1, is that correct? A. That is correct.

"Q. 20. How did you and Heller fasten this iron piece to the wooden piece? A. We put it on with a bolt here (pointing to the hole marked X in the wooden piece) and I believe we had a a wooden screw behind (pointing to the hole marked XI).

"Q. 21. This iron piece has a bar, riveted to it along one side and bent at one end at an angle of about 45°. How was that bar at the time you and Heller made it and put it on to the wooden part here marked part 1? A. It was straight.

"Q. 22. How are you able to say that these two pieces before you, the iron piece and the wooden piece forming this exhibit Heller butt adjuster with adjustable extension, are the ones which you and Heller made in 1880? A. I know the wooden part by this cloth on one of the rollers and the belt on the same roller. I know this iron piece because I cut it out, Heller and I, he held it to the machine, or one of us, and the

other marked where to cut; we cut it with a cold chisel.

"Q. 23. Here is another bend in the bar riveted to this iron, not quite half way from the angle, mentioned awhile ago, and the other end, do you recognize that bend? A. Yes that is the bend I put in myself.

"Q. 24. When did you put in this bend that we are talking about? A. In 1880.

"Q. 25. Why did you put in this bend? A. This end (pointing to the smaller end of the iron piece) came too close to the butts of the grain and I bent it back some.

"Q. 26. You say you did that in 1880. A. Yes.

"Q. 27. These holes in the end of the bar on the iron piece do not correspond to the holes X and XI in the wood, what have you to say about that? A. The bar has been cut off.

"Q. 28. Do you mean that it used to be longer? A. Yes I think it used to be longer—it was longer.

"Q. 29. Do I understand you to say that this bar extended out and had another hole in it at the time you and Heller fastened it on to the wooden part in 1880? A. Yes sir.

"Q. 30. Did the bar have this hole, which now appears in it between the end hole in the bar and the sheet iron at the time you and Heller put it on the wood part in 1880? A. I think not, I think that hole was made afterwards.

"Q. 31. Look at the end of this bar and see whether it has been cut off with a cold chisel? A. I think it has been cut off.

"Q. 32. At the time that you and Heller put this iron piece on the wood piece in 1880, was the iron piece pivoted to the wooden piece or rigidly fastened to it? A. I don't know what that means.

"Q. 33. Was it fastened stiff or loose? A. It was fast.

"Q. 34. Do you mean that it was stiff with the wooden piece? A. Yes.

"Q. 35. This bar, on the iron piece, you say was straight? A. Yes.

"Q. 36. And fastened to the upper side of the wooden piece by these holes X and XI. A. Yes; that is correct, we had something under at the hole X to keep the iron from coming too close to the roller.

"Q. 37. And the iron part and the wooden part would move together, so that they would be the same angle. A. Yes sir.

"Q. 38. What machine was it that you and Heller used this butt board and extension now before us, on? A. A Beloit binder.

"Q. 39. I believe that was a Parker & Stone machine. A. I can't tell the name, we called it Beloit.

"Q. 40. When did you buy that Beloit machine? A. 1879.

"Q. 43. How did Mr. Heller come to help you make this butt adjuster extension from the old Triumph machine and put it on your Beloit machine? A. In 1880 Heller was agent for the Beloit machine and he came around to see and examine machines.

"Q. 44. After you and Gottlieb Heller made this iron extension and fastened it on to this wooden butt adjuster, how long did you use it? A. We used it in 1880 and '81.

"Q. 45. How long did this wooden butt adadjuster and iron extension' marked, 'Heller butt adjuster, with adjustable extension', remain in your possession how long did you keep it? A. Two years.

"Q. 46. How long did you keep the machine?

A. I kept the machine three years, and two years with this iron on.

"Q 47. I am not asking you how long you used the machine or how long you used this iron, but I want to know when this iron was taken away from your place. A. It was in 1882, in the spring, before the harvest.

"Q. 51. Was this iron extension on the butt adjuster when they were taken away? A. Yes, sir.

"Q. 52. At the time they were taken away how was it fastened on to the butt adjuster? A. I think it was fastened on by a bolt and a screw. I did not remember for sure that it was on, but I went with this man (pointing to Mr. Whitney) over to the next man who got the machine and he told me it was on when he took the machine away.

"Q. 53. Who was the man that got the machine from you together with the binder and butt adjuster? A. Mr. Richard Messing.

"Q. 54. And he told you that the iron extension was still on the butt adjuster when he got the machine of you. A. Yes sir.

"Q. 55. You say Mr. Messing got the machine and binder with this butt adjuster and an iron extension from you in the spring of 1882. A. Yes sir.

"Q. 64. How are you able to fix the date as 1880, when you put this iron extension on the butt board? A. I have got a boy who was born in 1878, and my brother cut my grain with his McCormick Harvester in that year; and next year I bought the Beloit machine from Rubins, and the next year when Heller was agent I put this extension on.

"Q. 67. Is this the only iron extension that you ever helped Heller to put on a butt board? A. Yes, sir, that is the only one.

"Q. 68. Who bored this hole marked X? A. I couldn't tell whether I made it or Heller.

"Q. 68. One of you made it at the time you fastened the iron extension on. A. That is right.

"Q. 69. Here is another hole in this wooden butt adjuster XII, with a short bolt through it. Who made that hole and put in that bolt? A. I can't tell that.

"Q. 70. Was it done when the machine was at your place? A. No it was not.

"Q. 71. And on the other side opposite this hole, marked XII, is a screw and washer, who put them there? A. I don't know.

"Q. 72. Were they put there while the machine was at your place? A. No.

"Q. 73. At this roller which has a piece of cloth tacked around it is a rubber belt, which you say you put on. A. Yes I put it on.

"Q. 74. Where did you get this piece of rubber? A. I bought that in Abilene.

"Q. 75. How do you know that this is the piece of belt that you put on? A. I know it by the holes and string where the ends are sewed together.

"Q. 76. What was the old belt where this one now is? A. I couldn't tell, it was a black belt, either leather or rubber.

"Q. 77. How do you know that this piece of cloth tacked on this roller is the piece of cloth which you put on? A. I know it from that color, (pointing to the little streaks).

"Q. 78. What did you use to make this piece of cloth tacked on to this roller? A. I cut it out of a piece of clothing. I put it on to keep the canvas from slipping around that roller.

"Q. 79. Was this bend of about 45° at the end of the iron bar on this sheet iron piece made while the machine was at your place or after-

wards? A. Afterwards; after it left my place.

"Q. 83. You are sure that this butt adjuster and this iron extension are the very same ones that you and Heller put on your Beloit machine in 1880? A. Yes, sir, I am sure."

In the above testimony it will be observed that Mr. Schlesener is *positive* that the various features of the Heller butt adjuster, which made the sheet iron extension pivoted in its connection with the butt adjuster, were not present at the time he and Heller made the butt adjuster extension, and were not added while it remained in his possession, which was until the summer of 1882. He says that the short bolt through the hole marked XII, and the screw opposite to it, and the bend of about 45° in the bar on the sheet iron extension, were *none of them* made while the device remained in his possession; but that the bar or arm was extended up to the hole marked XI, so that it was fastened to the wooden frame by a bolt through the hole X and a screw in the hole XI. This will be apparent from the fact that the distance between the holes X and XI corresponds to the distance between the holes originally punched in the bar, as appears from the holes in which rivets still remain. Mr. Schlesener explained that the device after it was made remained in his possession *without change*, and that the sheet iron extension was *rigidly* fastened to the wooden frame until it passed into the possession of Mr. Messing in the spring of 1882.

Complainant called Mr. Messing as a witness and his testimony corroborated that of Schlesener as to these points. Mr. Messner furthermore testified that the butt adjuster remained in the possession of his father *until the spring of 1883 without change*. We will quote from his testimony as to these matters, beginning on page 115 of the record.

"Q. 10. Who had owned or used the machine before your father bought it? A. Gotthilf Schlesener.

"Q. 11. What year was it that your father bought this machine? A. It was in 1882.

"Q. 12. What time of the year was it? A. Very shortly before harvest.

"Q. 13. Did you see that machine at the time your father bought it? A. I did.

"Q. 14. Was it brought directly from Schlesener's farm to your father's farm? A. Yes, sir, I brought it there myself.

"Q. 15. It had on it a butt adjuster, did it not? A. Yes sir.

"Q. 16. Was there any extension or prolongation of any kind on the butt adjuster. A. There was.

"Q. 17. State whether that butt adjuster extension was of wood or iron. A. It was of sheet iron.

"Q. 18. How was it fastened to the butt adjuster? A. It was fastened by an iron bar or strap iron, rigidly.

"Q. 19. Look at this butt adjuster, before you, and this iron adjuster extension marked, 'Defendants' exhibit Heller butt adjuster with adjustable extension, parts 1 and 2,' and state what they are, if you know. A. I did not run the machine long enough to get acquainted with the butt adjuster well enough to know it after six years, but I know it had an adjuster just like this one with an extension like this iron piece.

"Q. 20. Was the strap iron on the iron piece bent at about 45° near one end, as shown in this piece before you or was it extended out straight? A. It was straight.

"Q. 21. How was the extended portion of the bar, or strap iron attached to the butt adjuster? A. It was fastened by a bolt or screw, or two screws; I can't tell just exactly whether it was bolts or screws.

"Q. 22. Did this method of attachment hold

the sheet iron extension fast, or rigid with the butt adjuster, so that its positions changed as the position of the butt adjuster changed, or loosely so that it could assume different positions without reference to the position of the butt adjuster? A. It was rigid so that it could not move without moving the butter.

"Q. 23. The extension, then, was not pivotally connected with the butt adjuster. A. No sir.

"Q. 24. How long did this machine which your father got from Schlesener remain at your father's place? A. It remained there till the spring of 1883.

"Q. 25. Who got it then? A. We were ordered by Mr. Heller to take it down town to Charley Weaver's place, and we did so.

"Q. 26. You say that was in the spring of 1883. A. It was.

"Q. 27. Was any change ma le in the method of attaching the iron extension to the butt adjust er, after the machine was brought from Schlesener's and while it remained at your father's place? A. No sir."

It thus appears from the testimony of Mr. Messing that the butt adjuster that was made by Schlesener and Heller in the summer of 1880 and which passed into the possession of Messing and his father in the summer of 1882, remained *without change* and the sheet iron extension *rigidly* connected with the frame of the butt adjuster *until the spring* of 1883, when the machine passed into the *control or came under the orders* of Heller. Before that time—the spring of 1883—the Steward patent in question was issued—February 20, 1883.

Undoubtedly, therefore, the changes which conformed the Heller butt adjuster into its present condition were made after the machine passed under the orders of Heller *in the spring of 1883*, and his statement that he made this

identical device in the summer of 1878 is shattered beyond repair.

6. In addition to the above matters which conclusively contradict Heller's testimony, there is yet another circumstance equally strong that his evidence is false. Heller says that he "nailed" a piece of tin or sheet iron on to the wooden frame of the adjuster, which was unsatisfactory, and that he then made the present sheet iron extension and bolted it on so as to be adjustable. In order to show that we do not misunderstand him, we will quote from his testimony on page 307 of the record, in answer to question 8.

> "I found when the grain was short and thin it did not make the butt good on the bundle. I extended the adjuster so as to keep the straw of the bundle even. First I only nailed a piece of tin or sheet iron on. That did not satisfy me, and then I made an extension out of sheet iron and heavy hoop iron. I made that so as to be just straight with the butt of the bundle. In this way it satisfied me. Of course I made it so it would adjust and keep straight with the butts of the bundles."

He went on to describe the device more in detail and produced the Heller exhibit before the Court as the identical butt adjuster about which he was talking. An examination of this device will show that no extension of any kind was ever *nailed* to it. There are no nail-holes or marks where nails have been driven. In reference to this point Mr. Whitney on page 296 of the record said:

> "According to Heller's evidence this butter extension was used but very little, a part of the harvest of 1878 and a little in 1879; that previous to putting on this part C, butter extension, which is shown to be pivoted to the adjuster he used a tin or sheet iron nailed rigidly to the adjuster. By examining the adjuster frame which he identifies, exhibit part 1, as the one used by

him it is very plain to be seen that no such extension was ever nailed thereto, for the reason that if any such piece had ever been nailed thereto the traces of such nailing would necessarily have been left. There being no marks of nails, or nail-holes, except the ones used in the construction of the frame, it would be safe to infer that there never had been any such piece nailed to it as he has described."

Mr. Steward also considered this statement of Heller's as to nailing a piece of tin or sheet iron on the adjuster, and on page 221 of the record said:

"Mr. Heller says, in answer to question 8; 'First I only nailed a piece of tin or sheet iron on.' Now, the Heller exhibit shows that no nails have ever been driven into the wood, except those which are used to hold the tenons of the frame into the mortises, and others to hold the boarding on. I am satisfied that no such nails were ever driven. If Heller drove nails in his, then *this* exhibit was not his."

An inspection of the Heller exhibit before the Court will show that Mr. Whitney and Mr. Steward are right in their testimony that nothing was ever nailed to the frame as Heller claimed. As Mr. Steward says, if he nailed a piece of tin or sheet iron to some adjuster, it was not *the* adjuster produced by him and to which he claims to have nailed the piece of tin or sheet iron.

7. Heller made a sketch to illustrate the device which he claims he made and used in the summer of 1878. A copy of this sketch is shown in sketch 22 opposite page 216 of the record. The full lines show the sketch as he *made* it and the dotted lines show the sketch as he *modified* it during his cross-examination. The small figure, indicated by the letters D and g, represent a further modification made to meet the exigencies of cross-examination. In so far as this sketch 22 illustrates "Defendants' exhibit Heller butt adjuster with adjustable extension"

we have shown that he never made any such device as he claimed, and in so far as it illustrates any device whatever it illustrates an *impractical* and *inoperative* one, and one that manifestly he had never tried, as the defects and mistakes contained in the sketch could not otherwise have occurred. The impractical and inoperative character of the device shown in Heller's own sketches is fully brought out in the testimony of Mr. Steward and Mr. Whitney, both experts in the art and with the benefit of many years practical experience in forming their judgments. Sketch 22 opposite page 216 is a copy of the sketch made and produced by Heller himself. In this sketch he has attempted to show the parts forming a parallelogram. In the full lines he shows the lever by which he purported to adjust the butter and its extension, but in cross-examination he changed the location of this lever to that indicated by the dotted lines. Owing to the proportions and arrangements of the parts, the butt adjuster and its pivoted extension, if made as shown in Heller's own sketch, would assume the position shown in sketch 23ª opposite page 217 of the record. When the butter is moved to carry the short grain further to the rear of the machine to insure central binding, the extension would be thrown forward into the position shown in the sketch opposite page 217 of the record, instead of correspondingly moving back to engage the butts of the grain after the straws had passed adjuster.

These matters are fully discussed and the inoperative and impractical character of the Heller device, as illustrated in his own sketches, brought out in the depositions of Mr. Steward, beginning at page 216 of the record and ending near the bottom of page 221, and in the depositions of Mr. Whitney, beginning near the top of page 296 and ending near the bottom of page 297. We do not deem it necessary to quote this testimony at length, but refer the Court to it with the statement that both Mr. Steward and Mr. Whitney, from their long experience and thorough mechanical knowledge, testified that if the

Heller device was as illustrated in his sketches it could not be successfully and practically used to perform the functions and accomplish the objects of the Steward invention covered by the claims in suit.

In view of the foregoing, we insist that the operations of Gottlieb Heller cannot affect the validity of the Steward patent. The evidence falls far short of establishing a prior use of the inventions secured by the 20th and 21st claims beyond a reasonable doubt—the requirement of the law. On the contrary, we think it is established beyond a reasonable doubt that Heller never made or operated in 1878 the device which he produced, nor until many years thereafter. But in view of the testimony of himself and other witnesses, it may be asked what it was that Heller really did about the year 1878. We think a careful consideration of the evidence will not only disclose the fact that he did *not* do what he claimed but substantially the extent to which his operations went, which was no further than to attach a *fixed* or *rigid* extension to the butt adjuster.

We do not think it necessary to claim that Heller never did anything, but we do insist that he never did anything that can affect the Steward patent. We take this lenient position out of regard to the other witnesses who have been called to corroborate Heller, and who remember, in a general way, that he did something. Two trips were made by the defendants to Kansas in reference to the matter, a large number of witnesses were examined, abundance of time was taken, and yet what Heller actually did remains a matter of dispute. We think that a reasonable conclusion is that all that he ever did prior to the issuance of the patent was to nail on a stiff extension to the machine which he bought from Rubin Bros. in 1878. We will collate the evidence and see how it supports this theory. Mr. Heller himself said:

> "First I only nailed a piece of tin or sheet iron on." (Record 307, Ans. to Q. 8). "I put first a

sheet iron on, but that was not exactly an extension." (Record 312, Ans. to X. Q. 57). "I made a stiff one for the new binder." (Record 315, Ans. to X. Q. 96). "I nailed a piece of sheet iron on the end of the adjuster to hold it up a little—I mean the short grain. I nailed it to the adjuster with two or three nails above and two or three below, and it was in the same position as the sheet iron extension in this exhibit, 'Defendant's exhibit Heller butt adjuster with adjustable extension,' but was stiff. and in this respect was like the third one I made." (Record 322, Ans. to R. D. Q. 145).

Mr. Rubin who sold Heller a Beloit binder, June 15, 1878, says that he saw the machine shortly afterwards with an extension on the butt adjuster. We will quote from his own language. He says:

"It was a piece of sheet iron fastened to the adjuster in some way." "I don't really know how it was fastened to the adjuster." (Record 323, Ans. to Q's 6 and 7). He first saw the extension "In the harvest of 1878, in the latter part of June—the second time when I came to look at the machine, which was probably about 12 days after I sold the machine, and had not previously cut very much." (Record 324, Ans. to X. Q. 28). "I only saw it working once." "He told me he did make one more and I saw it too." (Record 326, Ans. to X. Q's 38 and 43). "It was a piece of sheet iron and screwed on the frame of the adjuster, as much as I remember. That is what he told me. I saw it myself sometime after, and that is the way I remember it." (Record 326, Ans. to X. Q. 46). "The extension was screwed on the adjuster stiff and had to move with it." (Record 327, Ans. to X. Q. 49).

George Heller son of Gottlieb Heller, testified in reference to the extension which his father claimed to have put on the machine in the harvest of 1878, as follows:

"The very first one he put on and just used a day or two was just put on with nails. The next stiff one was put on with screws or bolts. I don't remember which, on the top or side of the adjuster." (Record 333, Ans. to X. Q. 35). "The one that was nailed on came loose part of the time because nails don't stick in the wood as well as bolts or screws." (Record 333, Ans. to X. Q. 37). "I also told him [Steward] that I did not know exactly how it worked until I could study over it or see the old one." I have talked with my father some." (Record 334, Ans. to X. Q. 39 and X. Q. 47.)

Mr. Stroth called by the defendants testified to seeing a board or extension of some kind on Heller's butt adjuster. In describing it on page of the record said:

"It was a small board, I believe it was a wooden board, about 14 or 15 inches long, 8 inches wide, about one-half inch thick. I cannot tell how it was fastened."

Rosina Heller, wife of Gottlieb Heller, who says she ran her husband's machine in 1878, on page of the record said:

"He put a tin on the little elevator to keep the bundles straight on the bottom." "It kept straight all the time with the bottom of the bundle, and when the little elevator moved, it moved back and forth with the elevator."

Gottlieb Heller being a second time produced by the defendants, in speaking of his butt adjuster extension on page of the record, said:

"The first one I made was a stiff one, sheet iron too. I could not tell how long I kept that one." "In the year 1880 I put one on in stiff form. A board instead of sheet iron. It was fastened with heavy hoop iron."

In view of the above testimony, how natural it was

for Mr Rubin and the other disinterested witnesses to confound the *stiff* butter extension which Heller admits that he made in 1878 with the adjustable extension that was produced before them when they were called upon to testify. Their recollection of the extension which they saw eight or nine years before became confused, and they easily blended the details of its construction with the device that was before their eyes and present to their comprehension. If we accept Heller's admission that he made a *stiff* extension in 1878, it is easy to reconcile the testimony of Mr. Rubin and others with the facts, by concluding that what they saw was really that *stiff* extension, and without any intention to falsify, their evidence was given under a present misapprehension. Mr. Rubin says that it was about twelve days after he had sold the machine to Heller that he saw it with the extension on. It is improbable that Heller was at that time using a *second* extension, that he had tried the *stiff* extension on the machine, discarded it, and adopted another *adjustable* extension *within the first twelve* days that he owned the machine. In this way a reasonable view of the testimony can be taken without having to say that any of the witnesses, except the Hellers, wilfully testified falsely. As to the Hellers, we have already shown that their evidence is false in several important particulars, and that in these particulars they must have known that they were testifying falsely. We say therefore, that all that Heller did in those early days was to make a stiff or rigid extension to his butt adjuster which did not contain the invention of the Steward patent.

In addition to the Heller matter, the defendants examined a witness named John B. Kirch living at Winona, Minn., who had been agent for the complainant in 1880 and until he became connected with the Winona Co. He claimed that in 1881 he took a board "and held it below the butt adjuster." (Record 356, Ans. to Q. 11). He never made either a full-sized butter extension, or a model or a drawing of it. He never obtained nor applied for a

patent. He says however that "In the latter part of June 1881" he came to Chicago and saw Mr. Deering about it and that Mr. Deering directed one of his superintendents (Mr. Carver) to make the device that he says he described to him. He says that Mr. Carver never sent him a butt adjuster extension and he appears never to have done anything further in reference to the matter. His evidence cannot possibly operate to show that he ever did anything more than to entertain some vague ideas or opinions in reference to the subject.

But without dwelling upon other objections to the testimony of Kirch. we simply desire to say that, conceding that Kirch did all that he claims to have done, it was too late to effect the invention of the 20th and 21st claims of the patent sued on. The evidence fully establishes the fact that Mr. Steward made the invention prior to the time that Kirch claims that he made it or visited Mr. Deering. Mr. Steward not only denies positively that he ever had any knowledge of Kirch's ideas from any source whatever, but shows that he had made the invention prior to the time that Kirch visited Mr. Deering, and in this he has produced corroborating evidence. Mr. Steward's testimony in reference to this matter, beginning on page 305 of the record, is as follows:

> "Q. 1. John B. Kirch. on page 573 of the defendants' printed record, testified that he made some experiments in March or April 1881, in which he held a board against the butts of the grain below the butt adjuster; and on page 576 he says that in the latter part of June, 1881, he went to Mr. Deering's factory and explained what he had done to Mr. Carver and Mr. Deering. Please state when you first learned that Mr. Kirch had visited Mr. Deering's factory and made these explanations to Mr. Carver and Mr. Deering, if you can. A. My first knowledge of what he testified to as facts was acquired from defendants' printed record in this case sometime during

the latter part of the year 1887. As to his having called at the works of Deering & Co., and explaining any such, or similar device, I have no knowledge, nor have I been able to acquire any information upon this subject. During those years it was my business to consider any suggestions brought in by parties or contained in letters, and if Mr. Kirch was ever there under the circumstances which he states, he would certainly have been referred to me. I knew him well and do not remember of having seen him, but am positive that I received no information from him that he had ever produced or conceived any ideas of such a device. It is possible that I was absent from the works, however.

"Q 2. Then you had no information, either directly or indirectly, of Mr. Kirch's experiment, at the time you made the invention embodied in this model, marked 'Complainant's exhibit Steward 1880 model.' Is this correct? A. Yes that is correct."

As to the time when he made the invention secured in the patent in question, Mr. Steward on page 222 of the record said: "This idea was conceived in 1877 or '78," and again on page of the record he testified:

"Q. 4. Here is a model which I offer in evidence as Complainant's exhibit Steward 1880, model. Please state when this model was made, under whose direction it was made, and all about it. A. This model was made by Christopher Bruescher, and completed in February, 1881; I think it was begun, however, in December, 1880. I made some experiments during that time, and think it was not completed for some time after it was begun. The spring was a rubber band which has decayed, and only remains in part. It was made strictly under my direction, and was

intended to illustrate the idea which I had been working on for several years.

"Q. 5. Here are some marks on the bottom board of the model; who put them there, and what are they? A. They are the words, 'March 10th, 1881, the word March being in shorthand. This date I wrote at the time I put the model away for safe keeping.

"Q. 6. How far does the model, as it now appears before us, correspond to its construction and condition at the time you finished it, about February, 1881? A. No changes whatever, except that a little connectior pin is lost, for which I have substituted a domestic pin, and a piece of the rubber spring."

Mr. Steward mentions Christopher Bruescher as the party who made the "Exhibit Steward 1880 model," and to save trouble and expense a stipulation was made as to what Mr. Bruescher would testify to if he were called as a witness. This stipulation was made after counsel for defendants had seen Mr. Bruescher and talked with him and had been personally informed by Mr. Bruescher as to the facts to which he would testify. This stipulation is found at page 306 of the record and is as follows:

"For the purpose of avoiding the necessity of taking the deposition of Christopher Bruescher, it is hereby stipulated and agreed that the said Bruescher if called as a witness would testify that he made the model marked 'Complainant's exhibit Steward 1880 model,' and completed the same in or about February, 1881; that he made and completed said model under the direction of John F. Steward, as stated by the said Steward in answering question 4, on page 396. of complainant's printed record; and that said model now is in all respects just as it was made, except that the rubber used as a spring on said model at

the time it was made, has been almost wholly broken off and lost."

From the foregoing it appears that Mr. Steward conceived the ideas contained in his patent now under consideration in 1877 or 1878; that prior to March, 1881, he had the invention fully embodied in a model which he had begun about December, 1880; that such model was not only completed but was labeled and carefully laid away on the 10th day of March, 1881; that Kirch's earliest claim on the subject was that he "experimented in the spring of 1881" which he further defines by saying that it was "perhaps the latter part of March or April," and that everything, so far as the invention is concerned, had been done long before Kirch called on the complainant, if we give him credit for his call as he claims. Under these circumstances, it is evident that there is nothing in the Kirch matter that can affect the validity of the Steward patent No. 272,598 now under consideration.

The only matters touching the validity of the 20th and 21st claims of the Steward patent are the "Heller use" and the "Kirch matter." No patents were introduced showing an extension to the butt adjuster. As we understand it, the defendants make no attack upon the claims of the Steward patent now under consideration outside of the Heller and Kirch matters. We therefore submit and insist that in view of all the foregoing, the 20th and 21st claims of the Steward patent No. 272,598 are valid, and are infringed by the Winona Co.

In conclusion, we submit and insist that the Court below erred in dismissing the bill as to the Olin and Steward patents, and that the decision should be reversed with instructions to enter a decree for complainant.

THOMAS A. BANNING,
EPHRIAM BANNING,
for Appellant.

153-286

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CLERK.

IN THE

# Supreme Court of the United States.

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WILLIAM DEERING,
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*Appellees.*
} No. 54.

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**Appeal from the Circuit Court of the United States for the District of Minnesota.**

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## FINAL SUGGESTIONS ON BEHALF OF THE APPELLANT.

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**THOMAS A. BANNING,**
**For Appellant.**

BYRON S. ADAMS, PR., 512 ELEVENTH ST.

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## FINAL SUGGESTIONS ON BEHALF OF THE APPELLANT.

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MAY IT PLEASE THE COURT:

I desire to submit a few brief suggestions in reply to Appellees' brief, and in addition to what is contained in the main brief for Appellant.

### THE OLIN 1880 PATENT.

Olin was the first in the art to employ a *travelling* butt adjuster. He was the first in the art to show a butt adjuster mounted on *vertical* pulleys so that its *face* or *broad* side moving constantly forward engaged the butts of the straws and shoved them *in* so as to secure central binding and

evenness of straws at the butts, arranged *between* the platform on which the grain falls as cut and the binding mechanism. This effect is due to the fact that the butt adjuster *travels* or moves in the *direction* of grain delivery and is *adjustable* at its delivery end. Not a single patent in the record shows a butt adjuster *moving* in the direction of grain delivery and *adjustable* at its delivery end, prior to the date of the Olin invention. The board of the Green 1877 patent and the Elward 1876 patent does not travel, and therefore *retards* instead of *advances* the butts of the grain. The little canvass G of the Elward 1875 patent has no mechanism shown nor described to *move* it in the direction of grain delivery, is not *adjustable* at its delivery end, and is not arranged *between* the point where the grain begins its elevation and the binding mechanism. The moving chains of the Williams 1869 patent, for advancing blocks of wood, oppose each other on the respective sides, and do not operate upon the sticks of wood at their *ends* to move them endwise. The travelling belt of the Marsh 1864 patent does not have its face or broad side presented to the ends of the butts, and is not adjustable at its delivery end.

Olin was the first in the art to show a travelling butt adjuster that moved at a *greater* speed than the conveying devices, so that it could not only move the grain *endwise* as above explained, but *hurry* the butts up into a condition of parallelism to the heads. In fact, he is the first in the art to show a device operating upon the butts to move them with greater speed than the heads. The Court, in speaking of the Marsh 1864 patent, beginning with the bottom line on page 66, says that it was provided with a belt to carry up the butts of the grain, and that "this belt moved faster than the elevator." This is entirely erroneous. The Marsh 1864 patent will be found at page 491, and the reissue of this patent will be found on page 542. Both the

original and the reissue show and describe a belt F, which is mounted on the ends of *the same shafts* which carry the elevating belts. It, therefore, necessarily moves at exactly the same speed. The Court evidently fell into error from the fact that the patent says that "the band B will move quicker than the toothed apron D," the band B is the carrying or conveying band on the harvester *platform*, and the apron D is the elevating bands that carry the grain up the incline. There is absolutely no suggestion in the Marsh patent of 1864, or its reissue of 1875, that the belt F—the belt that the Court referred to, and which has to do with the butts—is to be, or can be, driven at a *greater* speed than the elevating belts. Marsh had no conception of such an arrangement or of the desirable results to be secured by it or of mechanism to secure it. On the contrary, his mechanism necessarily prevents more rapid movement, and ensures exactly the same speed of movement.

The defendant's construction on the contrary, like that of the Olin patent, provides for a *greater* speed of movement in the travelling butt adjuster than the elevating belts. It moves at least 25 per cent. faster. (Record, 272, answer to ×-Q. 209.)

The Olin invention and application both antedate the Bullock & Appleby patent, referred to by appellees' counsel, as showing the defendant's form of butt adjuster. The Bullock & Appleby patent was issued October 31, 1882, and its application was filed September 2, 1879. (Record, 560.) The Olin patent is dated January 27, 1880, and was applied for November 17, 1877. (Record, 14.) The testimony shows that the Olin machine—the one from which the drawings of this patent were made—was built and tested in the harvest field in the summer of 1877. (Record, 198–9, ×-Q. 107; ×-Q. 109.) "It was satisfactory in its work in adjusting the grain." (Record, 247, answer to Q. 13.)

The Olin invention was, therefore, in the harvest field—say, July, 1877, in a full-sized machine—and in the Patent Office November 17, 1877. The earliest claim put forward for the invention of the Bullock & Appleby construction was that its inventors had in on a machine "during the harvest—the fall of 1877," and that it was used in the shop "during the fall of 1877." (Addition to Record, 19.) The Bullock & Appleby invention was not in the field until the harvest of 1878. Mr. Appleby says that it was first "constructed and applied to grain binders" during the harvest, which he immediately corrected to "the fall of 1877." It cannot, therefore, be considered as anticipating the Olin invention. It should be considered, as appellant insists, merely as a subordinate improvement upon the Olin invention. The Olin should be construed to be a generic invention of the arrangement of a *travelling aggressively* operating, butt adjuster, having a *greater* speed of travel than the elevators, and arranged *somewhere* between the point where the grain begins to be elevated and the point where it is bound, *pivoted* at its receiving end and *adjustable* at its delivery end, whereby the stalks of grain can be moved endwise for evening the butts and for central binding, and hurried forward to a position of parallelism with their heads.

## The Steward 1883 Patent.

The invention of this patent dates back to a period prior to March 10, 1881, because on that date Mr. Steward had a working model of it completed, showing the entire invention, which he marked with that date upon it and filed away, and which is produced as an Exhibit. Mr. Steward says he made the invention considerably prior to this date, but for present purposes March 10, 1881, may be taken as the date of the completed invention.

Counsel for appellees has referred to the Howard & Bousfield 1883 patent. This patent was applied for December 12, 1881 (Record, 544), and it says that the invention was patented in England, September 22, 1881. Assuming that the English patent was for the same thing as the American patent, its earliest date would be September 22, 1881—more than six months after the Steward invention was entirely completed and the model exhibit made. Furthermore, the Howard & Bousfield patent was issued March 27, 1883, while the Steward patent was issued February 20, 1883. It is too late in any aspect in which it may be viewed.

In his opinion below in speaking of the Heller use the Court says that Schlesener "corroborates him in regard to a butt adjuster, with extension, being on Heller's machine in 1878." This is a plain error of fact on the part of the Court. Schlesener was called both by the defendants to corroborate Heller and by the complainant to contradict him. His deposition taken by the defendants will be found from pages 3 to 6 of the Additional Record. He says, on page 3, that he saw Heller's machine in both 1878 and 1879. From Q. 5 to Q. 11, he was interrogated in reference to a board called the "wind board" at the rear end of the binder for the adjustment of the heads. He was then asked in reference to the butter extension, and in answering X-Q. 23, on page 5, he said that he never saw either of these devices until the "year 1879 and 1880.". He says that Heller told him that he had "*nailed*" a butter extension on his binder in 1878, but of his own knowledge he knew nothing and testified to nothing in corroboration of Heller's claim that he had an extension of any kind on his 1878 machine.

All of the witnesses that were examined in reference to the Heller use were the following:

| | | | | | |
|---|---|---|---|---|---|
| Gottlieb Heller..... | Record, | 307; | Add. Rec., | | 15. |
| Reinhard Rubin..... | " | 322; | " | " | 18. |
| George Heller..... | " | 330. | | | |
| Edwin D. Bishop..... | " | 335. | | | |
| Gotthilf Schlesener ..... | " | 106; | " | " | 3. |
| Charles F. Knapp..... ..... | | | " | " | 6. |
| John Stroth..... | | | " | " | 8. |
| Rosina Heller..... | | | " | " | 12. |

This makes quite an imposing array of witnesses when their names are recited. A comparative examination and analysis of their testimony, however, shows extremely little that corroborates Heller's claim, that he used a *pivoted* butter extension in the harvest of 1878. Nearly all of them, however, who corroborate him as to the fact that an extension was used, fail to corroborate him as to the fact of its having been pivoted. We will briefly examine the statements of these witnesses in their order.

Heller, on page 307, testified that in 1878 he "*nailed*" a piece of tin or sheet iron to the adjuster frame. He says that this did not satisfy him, and that he then put on to the same frame *the pivoted* butter extension that was introduced as an exhibit. The appellant insists that while he may have *rigidly* nailed or screwed a sheet-iron extension on to his butter frame, he never employed a *pivoted* one of any kind until after the Steward invention. We will see what the other witnesses know and say about it.

Reinhard Rubin, on page 323, in answering Q. 7, says: "I don't really know how it was fastened to the adjuster;" and in answering Q. 15, says: "I don't know how the two were fastened together." Of course, a witness who does not know, cannot corroborate.

George Heller, a son of Gottlieb Heller, who was at that time about 17 years old, while insisting that his father, in 1878, used the identical exhibit offered in evidence, and which we have shown in our main brief was not made until 1880, and then of a different form, says, on page 333, in answering ×-Q. 35, that the first extension "was just put on with nails." He also admits, in answering ×-Q. 39, that when Mr. Steward asked him how the exhibit worked, "I also told him that I did not know exactly how it worked until I could study over it or see the old one." His corroboration of his father, therefore, simply goes to the fact that he *nailed* on an extension, and that he used an extension which we have shown conclusively he did *not* use, and which was not made until *two years afterwards*. Furthermore, the matter had made so slight an impression upon his mind that he admitted to Mr. Steward that he did not exactly know how it worked. His father's operations had certainly failed to impart a knowledge of the invention to his own son, so that if the art were dependent for its knowledge of the invention to one of the parties who claims to have used it, it would still suffer the want of it.

Edwin D. Bishop, who was called to corroborate Heller, in answering Q. 7, on page 336, says: "This improvement on the adjuster was a piece of sheet iron fastened to the lower end *rigidly*, as I remember it." Mr. Bishop's corroboration, therefore, goes no further than to the *rigid* extension.

Gotthilf Schlesener, who was called to corroborate Heller, and who, as we have already seen, never saw either the butt adjuster or the wind board *until* 1879 and 1880, says, on page 5, of the Addition to the Record, in answer to ×-Q. 28, that Heller *told* him he had, in 1878, "nailed" an extension on; and in answering ×-Q. 29, that Heller never told him that he put one on his machine in 1878, "in any

other way than by *nailing* it fast to the butt adjuster itself." The only corroboration, if such it can be called, that can be derived from Schlesener's deposition in behalf of Heller, is that in 1879 or 1880 Heller *told* him that he had tried an extension by *nailing* it on to the butt adjuster, but never told him of any other arrangement.

Charles F. Knapp was called to prove the use of a wind board, but says not a word about an extension to the butt adjuster on the Heller or any other machine. His deposition will be found on pages 7 and 8 of the Addition to the Record.

John Stroth, who was called to corroborate Heller as to the use of a wind board at the heads of the grain, was asked, on page 9 of the Record, Q. 18, about the butter extension, and said: "I can't tell how it was fastened." The next day, however, after this talk with Heller, and after seeing Heller's extension, which he would naturally copy, he says, in answer to Q. 23, that he put an extension on to his adjuster, and that "it was fastened *stiff* to the elevator—*nailed* to it."

Rosina Heller, the wife of Gottlieb Heller, was called to corroborate him, and on page 13 of the Addition to the Record, says that she herself ran the machine some in 1878, and in answering Q. 4, says that Heller "put a tin on the little elevator." This was evidently the tin extension which Heller and the other witnesses say was *nailed* first to the elevator frame. She then proceeds to testify that the Heller exhibit offered in evidence, was the pivoted device that her husband used in 1878. This device, however, as before stated, has been proved to have been made in 1880, and to have passed into Heller's possession or under his control only in the spring of 1883. Her corroboration amounts therefore, simply to the corroboration of something that did not exist.

Gottlieb Heller, being recalled by defendants, says, in answering Q. 10, on page 16 of the Addition to the Record, that the first extension he had "was a stiff one," and that he "changed it the same season to exhibit Heller's butt adjuster with adjustable extension," which, of course, is not true, as that exhibit was not made until 1880.

Reinhard Rubin was recalled on the part of the defendants, but in his deposition, on page 18 of the Addition to the Record, we find not one word about the butter extension.

We have thus analyzed briefly the statements of all the witnesses called in corroboration of Heller. They all testify either that his 1878 extension was a *rigid* one *nailed* or screwed on to the frame of the butt adjuster, or that they cannot *remember* how the extension was attached, or that the pivoted extension that he used was the exhibit Heller butt adjuster with adjustable extension, which we have shown was not made until 1880. The *only* witnesses who testified that Heller used a pivoted extension to his adjuster with parallelogram mechanism or otherwise are Heller, Heller's wife and Heller's son, and their testimony is predicated upon an exhibit which we have shown in our main brief was not made until two years after the time that Heller claims to have used it, and that it did not pass into his possession or under his control until five years after the time of such alleged use.

It seems to us impossible that any court, upon an examination of the testimony relied on to establish the Heller use, can invalidate the 20th and 21st claims of the Steward patent on such meagre, unreliable and contradictory testimony.

In regard to claims 20 and 21 of the Steward patent, Appellees' counsel insists in his brief that claim 20 is for

an inoperative or incomplete combination. The claim calls for the moving butt adjuster and the board *d*, "substantially as described." Referring back to the specification we find that this board is a pivoted one which is required to always preserve its proper angle with reference to the butts of the grain. This leaves the constructor at liberty to use any kind of mechanism that he may prefer to secure this proper and necessary angle. The 21st claim, however, is limited to the particular mechanism described and specified for securing this result,—in short a parallelogram, or equivalent mechanism. The 20th claim is, therefore, broader than the 21st. In another aspect the 20th claim may be regarded as for a *sub*-combination and such claims are constantly recognized and sustained. Appellees' counsel also claims that the results secured by the mechanism of the 21st claim may be secured in other ways than by the use of the parallelogram mechanism, and illustrates one such way opposite page 76 of his brief. What of it? A claim for mechanism to secure a result may be sustained although the same result may be secured by other mechanism. As to the criticism of each of these claims, therefore, it is submitted that it is insufficient and unsupported by the principles of patent law governing the construction of claims.

Respectfully submitted,

THOMAS A. BANNING,
*For Appellant.*

NOVEMBER, 1894.

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CLERK.

IN THE

# Supreme Court of the United States,

OCTOBER TERM, A. D. 1893.

No. 54.

WILLIAM DEERING, *Appellant*,
vs.
THE WINONA HARVESTER WORKS, C. L. BONNER, J. J. RANDALL, CASPAR F. SEARCH AND C. H. PORTER, *Appellees.*

*Appeal from the Circuit Court of the United States for the District of Minnesota.*

## Brief and Argument in Behalf of Appellees.

PHILIP C. DYRENFORTH, Esq.,
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THOMAS A. BANNING, Esq.,
for Appellant.

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*Appellees.*

## Brief and Argument in Behalf of Appellees.

MAY IT PLEASE THE COURT:

This cause is before this Honorable Court on a diminished record, involving only two patents out of seven that were involved in the case below. As the record, even as diminished, unavoidably contains pleadings and fragments of testimony not relating to the patents involved in this appeal, but to the other patents which were before the lower court, which may render it somewhat confusing, a brief recital of the proceedings had in the court below will, it is thought, be an aid to the Court in considering this record.

In the early part of the year 1885, William Deering, the complainant, brought suit against the Winona Harvester Works for infringement of two patents for a screw knotter, No. 278,639, of May 29, 1883, and No. 301,190, of July 1, 1884, each granted to one John W. Webster, and assigned to the complainant. The issue of that suit concerned the complainant and the defendant alone, and could have no interest to any other harvesting machine manufacturer in the country, since no other harvesting machine manufacturer was using the device or anything analogous to it. The only question involved as to these two patents was whether John W. Webster, the patentee, or Caspar F. Search, one of the defendants, was the inventor of the mechanism. Subsequently, and within a few weeks from the filing of the first bill, the complainant, William Deering, filed a second bill against the same defendants, charging infringement of five additional patents, of which two were No. 272,598 to Steward, and No. 223,812 to Olin, involved in this appeal. Thereupon a motion was made by defendants' counsel to consolidate the two cases and this was done by order of court. (24 Fed. Rep. 90.) Of the five patents covered by the second bill, one (No. 251,147), like the two knotter patents, concerned the complainant and the defendants alone; but the remaining four were of great interest to many other harvesting machine manufacturers in the United States, since, if held valid, there would scarcely have been a manufacturer in the country who would not have been liable for infringement of one or more of them. These patents were No. 191,264, No. 266,913, and the two patents involved in the present appeal, Nos. 272,598 and 223,812. The far-reaching nature of the suit as to the four

patents last mentioned was brought to the attention of harvesting machine manufacturers generally, with the result that the McCormick Harvesting Machine Company applied for and obtained leave to intervene in the suit brought against the Winona Harvester Works, and thereafter was a co-defendant in the court below. The testimony as to the two screw knotter patents (the subject of the first bill of complaint) was such as to satisfy defendants' counsel that the cause of the complainant as to those two patents was just, and accordingly, as to those two patents, the defense was withdrawn at the hearing. As to the remaining five patents, included in the second bill, the defense was continued, and as to those patents the court decided for the defense.

The Winona Harvester Works and the McCormick Harvesting Machine Company were each charged by the complainant with infringement of the patents Nos. 191,264, 266,913, 223,812 and 272,598; but as to the last-named patent they were not charged with infringement of the same claims; the Winona Harvester Works being charged with infringement only of claims 20 and 21 of that patent, and the McCormick Harvesting Machine Company being charged with infringement only of claims 3, 4, 9 and 10 thereof. Between William Deering and the McCormick Harvesting Machine Company a great deal of counter-litigation was in progress, and some time after the decision of this suit in the court below a general settlement of some sort was effected between them which included the matters in controversy in this case, and this will serve to explain the absence of the McCormick Harvesting Machine Company as a defendant on this appeal.

The complainant acquiesced in the decision of the court below, except as to the Olin patent No. 223,812 and the

Steward patent No. 272,598, on which this appeal is taken, and the absence of the McCormick Harvesting Machine Company as a defendant confines the charge of infringement of the last-named patent to claims 20 and 21.

In a letter written by complainant's counsel to defendants' counsel, shortly after the commencement of the second suit, the claims of the several patents as to which infringement would be charged were specifically set forth. (See Transcript of Record, p. 95.) This letter named claims 1, 2 and 3 of the Olin patent, *but no others*, as the claims upon which the complainant would rely and claim infringement. Nevertheless, in making out the *prima facie* case of infringement, claims 4 and 6 of the patent were included, (Transcript of Record, p. 82), and subsequently claim 5 also. (Transcript of Record, p. 100.)

Objection to the inclusion of claims 4, 5 and 6 among the claims of the Olin patent charged to be infringed was duly noted, (Transcript of Record, pp. 95, 96 and 100), and it is respectfully urged that the letter quoted on page 95 amounts to a stipulation from which the complainant could not recede.

If this view is taken by the Court, it will be unnecessary for the Court to consider the testimony relating to any of the claims of the Olin patent aside from claims 1, 2 and 3. Nevertheless, owing to the presence of the McCormick Harvesting Machine Company as a co-defendant in the case below, to which company the letter had no reference, there is testimony in behalf of the defense relating to the remaining claims also of the Olin patent, and reference will be made to it further on in this brief.

## Olin Patent, No. 223,812, of January 27, 1880.

*Subject of Controversy.*

This patent relates to a harvesting machine (not a grain-binder), and more particularly to the means of elevating the grain from the harvester platform, on which it falls as it is cut, to the top of the delivery apron, where it is discharged from the harvesting machine to be bound either by hand or by a mechanical grain-binder as the case may be. It consists, as stated with much reiteration throughout the specification and claims, in the combination of a "butt elevator" with the ordinary "harvester elevator," so that the butt elevator will elevate the butts of the grain and push the grain lengthwise on the main elevator during its travel from the lower platform to the point of delivery from the harvester. Each of the claims is confined in terms to this combination.

It is not pretended that the defendants have ever made, sold or used any harvester having a butt elevator in combination with the harvester elevator, or any equivalent serving to elevate the butts of the grain or to move the grain endwise while it is being raised by any kind of an elevating mechanism. The record shows that neither the complainant nor the patentee nor anybody else has ever sold or put into practical use any machine that would correspond, either in terms or in substance, with either the description or the claims of this patent. The Winona Harvester Works, defendant in this case, ceased to exist about five years ago, after a life of about four years, during which it manufactured and sold the Appleby grain-binder just as it was built by Appleby in 1877, and as it has been built and sold by the Appleby licensees generally (including the complainant) ever since, without

question by this complainant of their right, until this litigation was commenced in the manner before stated. The defendant (as well as the complainant) have throughout continued to build, use and sell their harvesting machines with the main elevator constructed and operating as it did in the ordinary harvesters, and as they were placed upon the market by most of the manufacturers of harvesters in this country since many years before the alleged Olin invention. The grain is carried up by the main elevator without any means whatever for elevating the butts or for moving it endwise of the harvester elevator, and is delivered from the elevator just as it has been by the ordinary harvester elevators for more than twenty-five years.

After it has been elevated and discharged from the harvesting machine, and fallen *upon the deck of the grain-binder*, when it is *in its free state there*, it is moved endwise by a traveling apron acting upon the butts of the grain in the same manner that a traveling apron had been shown in the Elward patent of July 6, 1875, as acting upon the butts of the grain to move it endwise along the harvester platform.

The Court in this case is asked by the complainant to construe out of this patent everything that the patentee has put into it, and to construe into it a machine to which the patent has no relation, and elements of that machine whose character and office individually, as well as in the combination in which they are placed, are directly antagonistic to the terms of the patent and the plan of the patent.

It is insisted on behalf of the defendants:

First. That there is no infringement, whatever construction may be placed upon the patent.

Second. That the patent, unless limited to the special combinations recited in it, constructed and operating conjointly in the manner and for the purpose specified, is invalid for want of novelty, and for want of patentability.

Third. That the combinations described and claimed in the Olin patent were not useful or practically operative.

Fourth. That the Olin combination, having been abandoned as soon as patented, and the Appleby machine having been extensively and notoriously manufactured and sold throughout the country under claim of right from the Appleby patents, and with the precise construction used by the defendants, for about eight years before any assertion or suggestion of adverse right under the Olin patent against any of the Appleby licensees, the complainant is now estopped from asking a construction of that patent that would subordinate the Appleby machine, and *a fortiori* cannot have relief in equity in respect thereto. The complainant seeks nothing from these defendants. In fact, as he well knows, there is not one of them capable of responding in damages if any should be awarded, From the first the scheme of the complainant has been to force the manufacturers of the live Appleby machine to pay him tribute under the Olin fossil; and the young and struggling Winona company furnished a temptingly weak defendant for the first suit.

## No Infringement.

A harvester is a machine as distinct in character from a grain-binder as a reaper is from a thresher, or a saw-mill from a planing-machine. The term "harvester," as used in the art, designates the machine which reaps grain and delivers it where it is to be bound, irrespective of

whether the binding is to be done by hand or by a mechanical binder. The term "grain-binder" is used to designate the machine which receives the grain as it is delivered from the harvester (usually as it falls from the harvester elevator), guides and compacts it into a bundle and circles it with a band, of wire or twine, and ties it.

One of the most common types of harvester on the market before mechanical grain-binders came into practical use was the elevator harvester (often termed "Marsh Harvester"), which carried the grain up an elevator consisting of a traveling apron having teeth on it to catch the grain, and delivered the grain from the top of this elevator apron upon a binding deck upon which it was discharged in a continuous stream. The binders (men or boys) stood on the machine, where they could bind the grain as it fell on this deck. One modification of this type of harvester, as used for hand binding, is shown in the Marsh patent, No. 41,080, of January 5, 1864, here in evidence.

The Olin patent was for a modification in a harvester of this type, and related to the means for elevating the grain from the reaping platform of the harvester to the place where it is allowed to fall from the top of the elevator.

The patent is designated a patent for a "*harvester.*" It shows and describes only a harvester, with the ordinary deck or platform on which the grain was delivered for hand binding in the old Marsh type of machine. No mechanical grain-binder, and no part of such a grain-binder, is shown. Every claim in it relates in terms to elements of the harvester concerned in elevating the grain from the platform on which it falls, when first cut, to the point where it is discharged from the harvester elevator

and allowed to fall freely upon the binder platform. From the statement at the head of the specification, through all the description and through each of the claims, exceptional care is taken to emphasize the fact that the invention relates to the *combination with the ordinary harvester elevator* of a *butt elevator which operates on the butts of the grain while the grain is being elevated by the main elevator*, so as to *elevate the butts* and move the grain *back on the harvester elevator*. It says:

> "In that class of harvesting machines where the grain is received upon a carrier platform and elevated over the drive wheel by an elevator and delivered to the binders or an automatic binder, it is desirable that there shall be no stoppage in the flow of the grain in its passage to its place of delivery; that the butts of the grain shall be carried up parallel, or nearly so, with the heads of the grain, so as to deliver the grain in proper shape for binding purposes, and that the grain shall be delivered to the receiving table so that it can be bound at or near the middle.
>
> "The object of this invention is to provide devices for attaining all of these results; and it consists in interposing a roller between the lower end of the elevator and the inner end of the grain carrier, to facilitate elevating the grain and prevent clogging at that point, and prevent the grain from being carried down or falling through between the elevator and carrier; in providing a belt or chain at the grain side of the machine for elevating the butts of the grain, supported on a swinging bar, so that it can be adjusted, according to the length of the grain being elevated, to deliver the grain so that it can be bound at the middle; in devices for operating and adjusting the elevator for the butts; in the peculiar

construction of the cover; in arranging and operating the belt for the butts so that it prevents any clogging by short grain at the heel of the sickle; in arranging the device for elevating the butts so that it will bear against the butts of the grain and crowd or move the grain back on the elevator toward the center, for the purpose of straightening the grain in its passage up the elevator, and delivering it so that it can be clasped or bound near the middle, to facilitate the ease of binding."

It then describes the ordinary construction of a Marsh harvester, supplemented by, "Q, the belt for elevating the butts," and afterward gives a particular description of the construction and operation of this "butt elevator belt" and the mode of combining it with the harvester elevator, so as to elevate the butts of the grain while being carried up by the harvester elevator, and the peculiar means of adjustment, made necessary by the fact that the power is applied to the swinging end of the elevator. It says:

"By arranging the pulleys, *c d*, so that their *flat faces will be parallel with the top surface of the elevator frame*, the butt elevator will be operated so that its face will strike against the ends of the butts of the grain *when elevating the butts;* and by supporting the butt elevator on a frame or support, pivoted at its lower end and free to swing back and forth at its upper end, the elevator can be so adjusted as to cause the grain to be delivered at one point, no matter what the length may be; for, *as the butts are carried up by the elevator*, the grain will be forced back *toward the middle of the elevator*, by reason of the belt or chain striking against the ends of the butts and forcing them back; so that, by this arrangement of the butt elevator, *it not only serves the purpose of elevating the grain*, but also

acts as means to cause the grain, *in its passage up the elevator, to be carried back*, so as *to deliver it at one point, regardless of its length*, the upper end of the butt elevator being carried in or out as the grain is short or long.

"For delivering long grain in proper position for binding purposes, the belt, or elevator, Q, is so arranged that its upper end will be over, or nearly over, the piece, B, in which position *the elevator will operate on a line with, or nearly with, the front of the backing, M¹, and the grain will be carried up thereby*, so as to deliver it at a point where it can be clasped and bound at or near the middle.

"For delivering medium grain the upper side of the elevator, Q, is to be *carried or swung over the backing or elevator* the required distance, and then, *as the grain is carried up the elevator*, the action of the face of the elevator or belt striking the ends of the butts will force the grain back, as it ascends, *toward the middle of the backing or elevator; and this carrying or forcing endwise of the grain will continue until it has reached the top of the elevator, Q*, when it is in proper position to be delivered at the same point as the long grain, so that it can be clasped or bound near or at the middle."

Again, after speaking of moving the "elevator, Q, over the backing or elevator" (the backing being described elsewhere as the back board of the main elevator, marked M¹ in the patent), it continues:

"By this arrangement, the grain, as it is being elevated, will be carried back or endwise, so that the middle of the grain will always come to the same point, no matter what the length of the grain may be, so that *it will be delivered in such a position that the binder who stands at*

*a given place or point, can clasp the sheaf in the middle and bind it, without the necessity of shifting his position to accommodate himself to the delivery of the grain, and by thus delivering all lengths of grain at a uniform point, the ease with which it is bound is greatly facilitated;* and in case an automatic or self-binder is used it can be arranged stationary at the point to bind the grain properly, *and the grain will be carried up and delivered at that point, so as to enable it to be bound by the self-binder at or near the middle, so that all devices which are now used for the purpose of adjusting a self-binder to the position to enable it to bind the grain properly, are dispensed with,* as the grain, whether long or short, will be delivered at the same point by shifting the upper end of the butt elevator, as before described.

"By this arrangement, all the devices for effecting a fore-and-aft adjustment for binding purposes are dispensed with, and the *same means employed for elevating the butts also afford the means for properly delivering the grain, and such delivery is effected during the transit of the grain up the elevator.*

"*The elevator, Q, need not extend the entire length of the elevator, but may stop some distance below the upper elevator roller,* as the grain after it is once forced to the proper point on the elevator, will be carried up and delivered in that condition."

Again:

"*The butts of grain are heavier* than the heads, and consequently *lag behind,* unless some means are provided to make them move faster than the heads. In order to *elevate* the butts even with the heads, the *belt or elevator, Q, is so arranged that the teeth, b, will engage with the butts of the grain on the roller, I, and carry them up while the heads are being*

*carried up by the elevator belts, M. The lower pulley, c, is so arranged that it will permit the teeth, b, on the elevator, Q, to clear the end of the roller and engage the butts, and this pulley, c, is located as close to the main frame as is possible and permit the operation of the butt elevator, which location of the pulley brings the butt elevator in position to enable it to catch any short grain, which short grain is liable to fall down and be caught by the heel of the sickle and clog the sickle. By locating the lower pulley, c, of the belt, Q, at the proper distance above the main frame, A, the teeth, b, on the elevator will come in contact with such short grain and force it forward onto the carrier platform, thus keeping the heel of the sickle clear at this point.*"

The claims are as follows:

"1. In combination with a harvester elevator, a swinging elevator pivoted at its lower end and suitable devices for shifting its upper end, whereby the swinging elevator forms a means for elevating the butts of the grain and delivering grain of different lengths at the same points, substantially as specified.

"2. The adjustable elevator or belt, Q, having its pulleys or wheels arranged with their faces parallel with the upper surface of the main elevator, in combination with such main elevator, for carrying the butts up even with the heads, substantially as specified.

"3. The adjustable elevator or belt, Q, having its lower end, *c*, advanced in front of the line of grain travel, and arranged as described in relation to the main elevator, substantially as and for the purpose set forth.

"4. The pivoted frame or bar, *e*, supporting the elevator, Q, in combination with the sliding bar, *l*, rod, *n*, and lever, *o*, for adjusting the upper end of the belt, substantially as and for the purpose specified.

"5. The shaft, W, wheel, *h*, and frame, *i*, in combination with the gear wheel, *g*, and pulley wheel, *d*, for driving the elevator and keeping the gear wheels, *g h*, in gear, substantially as specified.

"6. The elevator or belt, Q, in combination with the inclined board, R, and main elevator, substantially as and for the purpose set forth."

Now, it is not pretended that the defendants' harvester contains any butt elevator or any element that does any work corresponding to it. On the contrary, defendants' harvester is of the type on which Olin undertook to improve, and has no means of elevating the butts of the grain or of moving the grain laterally on the harvester elevator. The only means of varying the position in which the grain is delivered by the harvester elevator to the platform on which it falls when discharged from the elevator, is just that which Olin states his invention is intended to avoid, namely, "a fore-and-aft adjustment" of the binder.

After the grain has been discharged from the harvester, and *while it is in a free state on the platform of the grain-binder* to which it falls, a traveling apron is applied *on the platform of the grain-binder to facilitate the downward movement of the grain and at the same time guide the grain* into the grasp of the packing mechanism. *Its capacity for this purpose is due to the fact that it is not an elevator, and does not act upon the grain in its passage over the harvester elevator*, but does act upon it when it is falling freely and so surrendered to the control of the traveling apron. The plan of moving the grain laterally on the harvester, *so as to vary the position in which it was delivered from the harvester to the binder*,

was inherently impracticable, and no machine constructed on the Olin plan has ever been sold or gone into practical use. The history of it, as stated by complainant's witness, Steward, in cross-examination (Transcript of Record, p. 198, X. Q. 107–112), is that one machine was built by Olin in complainant's shop in 1877, and experimented with under the supervision of Olin. It was returned to the shop after these experiments, never used again, never offered for sale. and no other was ever built.

Ellithrop, an employee of Deering and his predecessors since 1869 in the experimental department of the factory, built the Olin machine referred to and tried it with Olin in the field. He says that the elevator belt "was satisfactory in its work in adjusting the grain," which he attempts to define as "moving it or *allowing it to move forward*, so that it will be received by the binder, so that the device (at that time as it was) was received in the middle of the bundle." (Transcript of Record, p. 247.) He says further, however, that "at first it was run from the bottom by a rope or belt which caused the adjuster belt to slip so that it would not move the butts of the grain half fast enough;" and that then the gearing was changed to run the belt from the top, "when it was more positive in its movements." In cross-examination, p. 249, he says they would take the machine out every two or three days and try it and then they "would come back and tinker around on perhaps something else." Then it was stored away in the loft over the office, and never used again. Thus died Olin's puny offspring. It was subsequently cremated.

It is obvious that, as the grain in passing up the harvester elevator would be *resting between the teeth of the harvester elevator*, any butt elevator operating upon the

grain *could not "straighten the grain,"* but would simply *twist the grain round the teeth of the main elevator.* This of itself would prevent its moving the grain endwise on the main elevator, and it would simply clog it at the butts.

The accompanying illustration, I, of the Olin patent, shows the butt elevator acting upon the butts of the grain in a diagonal way, as intended by the patent. The effect is necessarily to bend the butts round the teeth of the harvester elevator, and could not serve to move the grain endwise.

Further than this, the butt elevator of the Olin patent must, in order to operate upon the grain, be placed *so as to have its lower edge flush with the apron of the main elevator.* This requires the removal from the main elevator of all teeth that act nearer the side of the elevator than the innermost point to which the top of the butt elevator is to be swung. This would leave the butt end of the grain without any support at the lower end of the main elevator, so that it would be wedged into the angle formed between the main elevator and top of the butt elevator. It would increase rather than diminish the tendency of the butts of the grain to lag behind, and any effort to move the grain by a combination of the two elevators acting upon it contemporaneously while it was being elevated was necessarily a failure.

It was also practically impossible to adjust the butt elevator in the manner provided in the Olin patent, for, as the upper shaft on which it slides is necessarily horizontal, any lateral movement of the upper end of the butt elevator would increase the distance between its upper bearing and its pivotal point below.

The fact that a traveling apron could be so combined

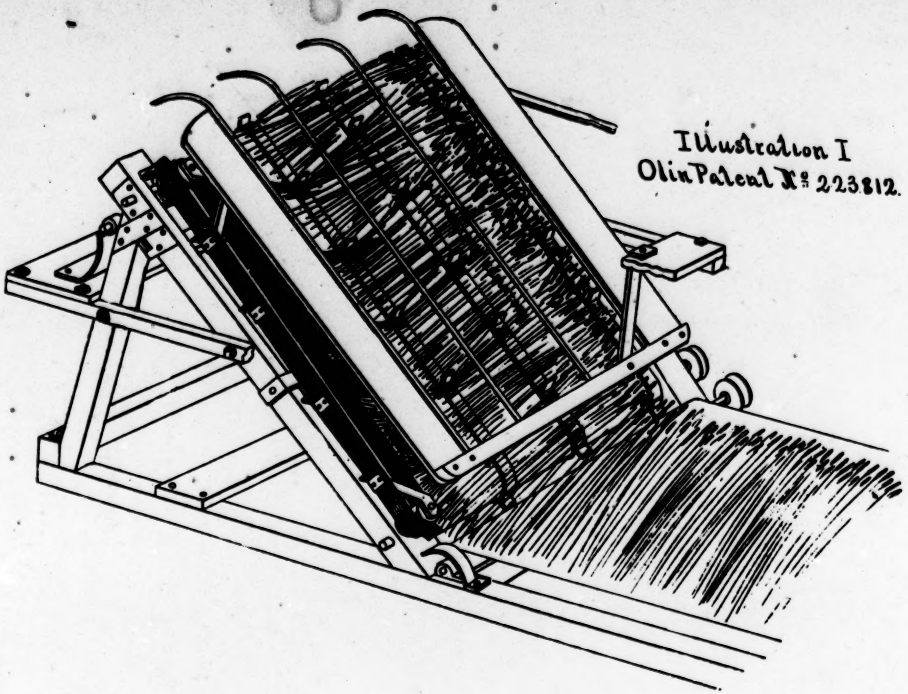


Illustration I
Olin Patent No. 223812.

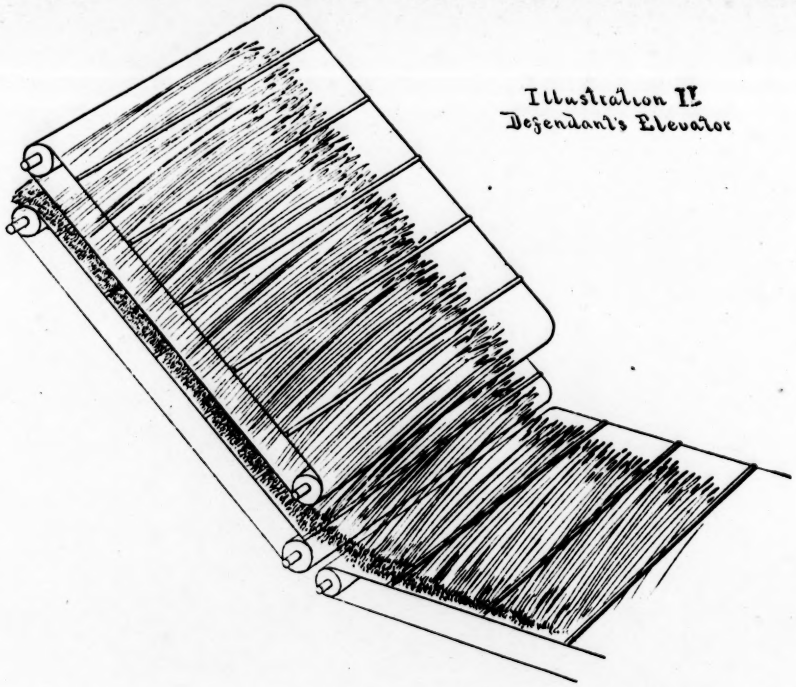


Illustration IV
Defendant's Elevator

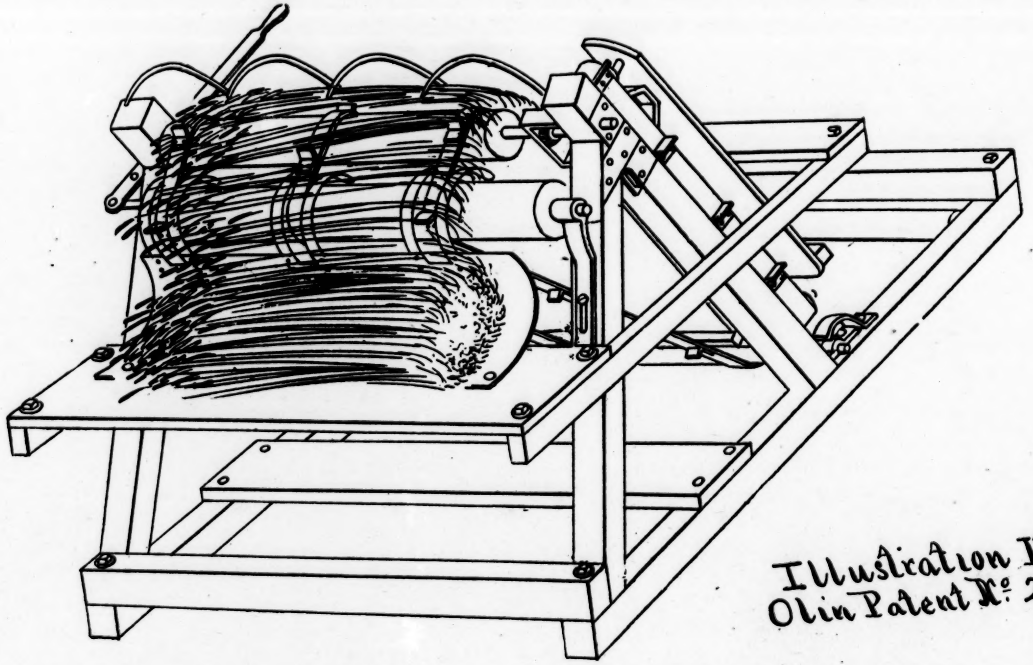


Illustration III
Olin Patent No. 223,812

with the deck of the grain-binder as to serve a useful purpose, and be practically a successfully operative machine in controlling the path of the grain when free from the control of any other agency, seems never to have occurred to Olin or to complainant until the Appleby grain-binder, provided with precisely the traveling apron of defendants' machine, was brought to their attention. Complainant then acquired a license to use it with the other Appleby inventions, and adopted it just as it came from Appleby, who had used it in all his grain-binders since 1877.

It took complainant about eight years to discover that this apron on the deck of the Appleby grain-binder infringed his patent for an improvement in harvesters, and to discover that this invention did not, as stated in his patent, consist in the combination of a butt elevator with a harvester elevator, to assist in raising and guiding the grain from the harvester platform to the point of delivery from the harvester elevator.

The accompanying illustration, II, of defendants' elevator, will show the construction of its harvester elevator, which lacks every peculiarity of the Olin patent, this illustration being a view of the grain side of the machine. Illustration III of the Olin patent shows the Olin harvester elevator from the side where the grain is discharged, with the grain falling as it would be delivered from that elevator upon the deck, the position in which it falls from the harvester elevator (according to the plan of the Olin patent) regulated by the combined action of the butt elevator and the main elevator during the travel of the grain from the harvester platform to the point of discharge of the main elevator.

Illustration IV, of defendants' machine, shows the McCormick harvester as seen from the same point, with the grain-binder attached in the position occupied by the platform, P, of the Olin patent where the grain is deposited after it is discharged from the combined elevator of that machine. As to this feature the Winona machine is substantially the same as the McCormick.

It will be seen that the traveling apron on the deck of the grain-binder only operates upon the grain when it is *falling freely and unaffected by any other propelling mechanism.* It does not serve to *elevate* the butts, but *depresses* them. It does not, like the Olin device, operate to overcome the *tendency of the butts to lag, due to greater gravity,* but operates *in the same direction as gravity.* It is not *shifted at its upper end.* It cannot affect the *delivery of the grain from the harvester to the platform of the binder.* The means of varying the point at which the longer or shorter grain shall be delivered to the binding deck from the harvester elevator is, as indicated by dotted lines, by the "fore-and-aft adjustment" of the binder, which it was the object of the Olin construction to avoid.

Every claim of the patent is as explicitly framed to exclude by its terms the downward moving apron operating on the grain in its free state as it falls on the deck of a grain-binder, as if the patent had been drawn with special reference to avoiding such a construction. If the patentee had known such an apron on the deck of a grain-binder to be old, he could not have selected more unequivocal language in which to express his claim, in order to distinguish his invention from it. The language of the claims is not accidental, for it corresponds exactly with the often-reiterated expressions of the specification.

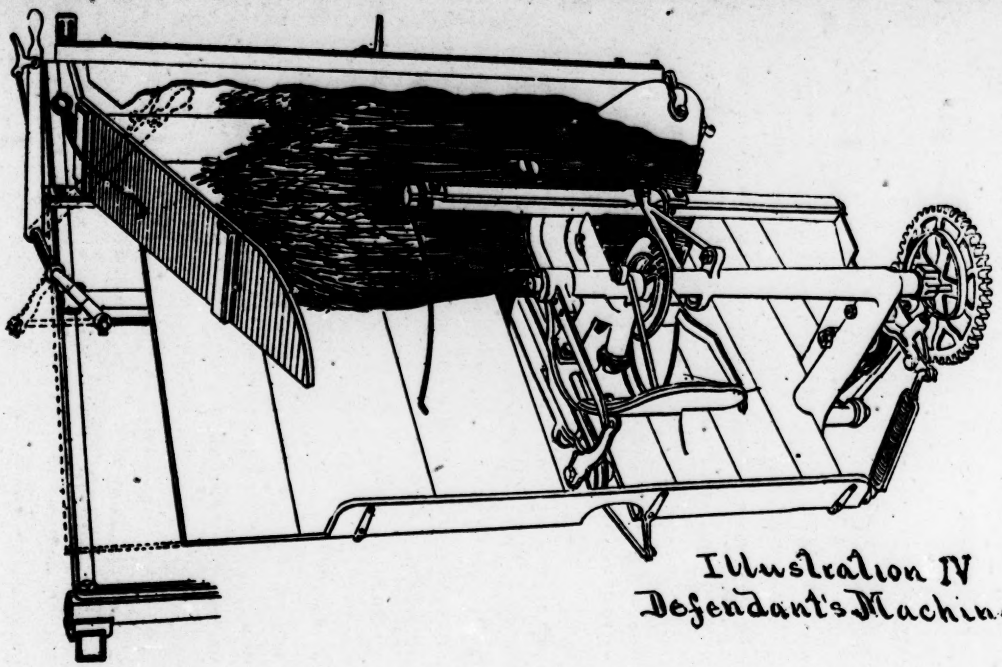


Illustration IV
Defendant's Machine

If the patentee had desired to assert a claim to the traveling apron operating on the butts of the grain, in any position, and in connection with any kind of a machine in which grain was handled, and capable of adjustment to vary the angle of travel, it would have been very easy for him to make a claim for such an invention, though probably quite impossible for him to have either obtained or sustained such a claim. He cannot have his explicit claims so construed as to eliminate from them the limitations which he so explicitly embodied in them.

Take for illustration the first claim. The Court is asked to read it as if the expression, "in combination with a harvester elevator," were altogether omitted; as if the expression, "a swinging elevator," were omitted, and the term "an adjustable downward moving apron" substituted; as if the expression, "pivoted at its lower end," were omitted (for the defendants' traveling apron is not pivoted at its lower end); as if the expression, "suitable devices for shifting its upper end," were changed to read, "for shifting its lower end;" as if the expression, "whereby the swinging elevator forms a means for elevating the butts of the grain," were omitted; and as if the words, "substantially as specified," were changed to read, "in no respect as shown or specified."

Each of the remaining claims would require quite as radical reconstruction.

Referring to the second claim, the defendants' machine has no "adjustable elevator or belt, Q;" it has no belt or traveling apron of any kind, "having its pulleys or wheels arranged with their faces parallel with the upper surface of the main elevator." The pulleys or wheels of its traveling apron are not parallel to the main elevator. It has no elevator, or belt, or traveling apron of any kind, "in

combination with such main elevator," or "for carrying the butts up even with the heads;" and it has no combination that is "substantially as specified" in the patent.

Referring to the third claim, the defendants' machine has not "the adjustable elevator or belt, Q;" its traveling apron does not have "its lower end, *c*, advanced in front of the line of grain travel," but placed behind the line of grain travel. It is not "arranged as described in relation to the main elevator," or in any relation to any elevator that enables it to co-operate in raising the grain. It is not "substantially as and for the purpose specified," but substantially unlike, in a radically different machine belonging to a different class of machinery, and for a purpose essentially distinct from that set forth.

Referring to the fourth claim, the defendants' machine has no "pivoted frame or bar, *e*, supporting the elevator, Q." Its traveling apron, which defendant seeks to confound with that elevator, is not "in combination with the sliding bar, *l*, rod, *n*, and lever, *o*, for adjusting the upper end of the plate." The upper end of the plate is not adjusted at all. It is not "substantially as and for the purpose specified," either in its individual construction or in its relations to the other elements recited in the claim.

Referring to the fifth claim, this claim has reference to a peculiar construction for sliding the driving gear on the driving shaft at the upper end of the butt elevator in order to preserve the engagement of the pulleys which drive it with the gears on the shaft of the main elevator, while the driven end carrying these pulleys and gear is being shifted. The defendants not only do not use the elevator referred to in the patent at all, but they do not shift the driven end of the traveling apron used on their binder deck, and therefore have no occasion for the combination referred

to in this claim. Their machine does not have the frame, *i*, or any frame corresponding in nature or adjustment therewith, or any frame "in combination with the gear-wheel, *g*, and pulley wheels, *d*, for driving the elevator and keeping the gear-wheels, *g*, *h*, in gear." It has no elevator to drive by any such means. As it makes no adjustment of the driven end of its traveling apron, there is no occasion for any provision for keeping the gear-wheels in gear. The frame, *i*, is thus described in the specification of the patent:

> "*On the shaft, W, and sliding thereon, is a piece of metal, i, so formed as to have two arms parallel to each other and a connecting piece.* The arms of this piece, *i*, are located on the shaft, W, and between them is the wheel, *h*, so that this piece, *i*, is above and on each side of the wheel, *h*, and forms a guard therefor, to prevent any grain from becoming entangled therein. In the outer arm of this *sliding head, i*, is the journal bearing for the lower end of the shaft *d*', of the pulley or wheel, *d*, for the upper end of the chain, Q, *so that as the head, i, is moved back and forth on the shaft, the upper end of this belt, Q, must be carried with it, by reason of the journal bearing for the shaft, d', being in the sliding head.*
>
> "*By locating the wheel, h, between the arms of the sliding head and journaling the wheel, g, thereto,* as shown and described, it will be seen that the wheels, *g*, *h*, *must be in gear, no matter what the position of the upper end of Q may be.*"

Referring to the sixth claim, the defendants' machine has not "the elevator or belt, Q;" it has not any elevator or traveling apron in combination, "with the inclined board, R, and main elevator," or anything that is "substantially as and for the purpose set forth."

(See in this connection Dep. Henry B. Renwick, Transcript of Record, p. 344, Q. 16–20.)

That the claims were meant to mean just what they express is made plain, *first*, by the reiteration of the limiting terms in each of the claims; *second*, by the explicit terms used in the specification; *third*, by the title of the patent; *fourth*, by the file-wrapper and contents, which show that these modifications were introduced intentionally; *fifth*, by the action of the Patent Office in declaring the interference between the Olin application and others, in that the interference was not declared with any *claim* of the Olin patent, but only between a broad claim for a butting apron, not found in Olin, and the *description* of the Olin which *showed* a butting apron; *sixth*, by the fact that a claim for the combination of the traveling apron with the platform of the grain-binder was, after the interference, allowed Appleby & Bullock; *seventh*, by the state of the prior art, which limited the Olin invention to the special combination made by him; and, *eighth*, by the long acquiescence of complainant in the extensive manufacture, use and sale by others of the devices now charged to be an infringement of the Olin patent.

Complainant's experts, Stewart and Whitney, have argued that when the Olin patent said *harvester elevator*, and showed and described the *ordinary elevator of a harvester*, it meant the *packing mechanism of a grain-binder*, which is neither shown, suggested nor described. They have, of course, been unable to cite any instance where the term "harvester elevator" was used as applying to such packing mechanism in a grain-binder, and they have to admit that this packing mechanism does not elevate the grain at all. But if they should have this extraordinary construction put upon the language of the patent they

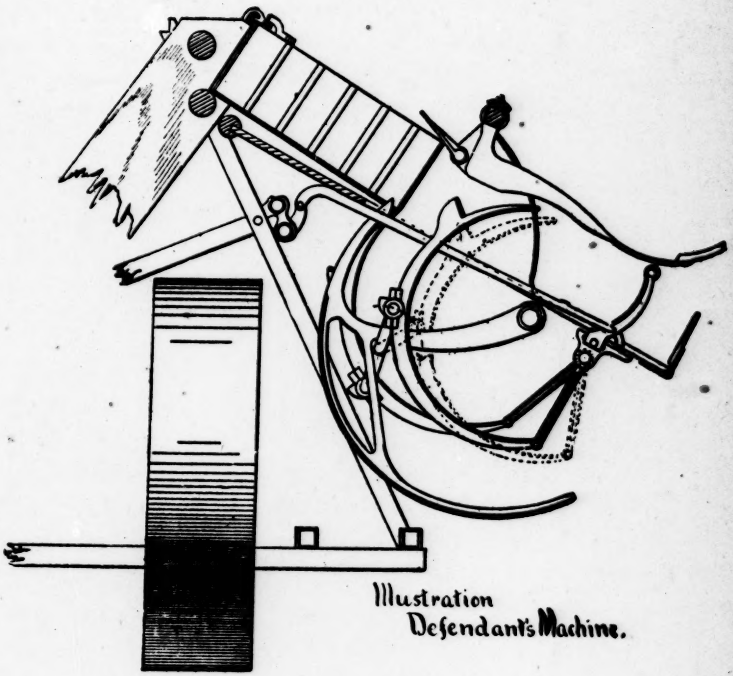


Illustration
Defendant's Machine.

This cut shows the relative position of butter apron, packers, and binding arm. The binding arm enters the deck just at the lower end of the butting apron, and the packers operate below this point.

would be no better off than before, for the traveling apron of the defendants' binder does not act upon the butts of the grain while it is under the control of the packing mechanism, any more than it does while it is under the control of the elevator. It acts upon the grain, and to effect its purpose *must* act upon it, *immediately between the time when it has passed from the control of the harvester elevator and the time when it is brought under the control of the packing mechanism*, and while there is no disturbing force to interfere with its action, as there would be if it were applied in combination with the harvester elevator after the manner of the Olin patent.

Steward and Whitney are obliged, in order to support their fanciful argument about the interpretation of these claims, to make drawings that falsify the defendants' machine in respect to the very parts upon which they are basing their argument. Their sketches (Transcript of Record, 3rd and 6th illustration following p. 256) show the packers as entering the deck of the binder just where the grain falls from the harvester elevator, and so acting upon the grain in line with the traveling apron or butter throughout substantially its whole length. They refer to it as so operating, and base their argument upon the assumption that it does so operate. Now, the fact is that none of the defendants' machines, and none of the machines of the Appleby type, as made by anybody (not excepting the complainant himself), have the packers operating upon the grain in any such relative position, and neither Steward nor Whitney could for a moment have been either ignorant or unmindful of this fact.

The foregoing illustrations of defendants' machine, as well as that opposite, show the relative position of the packers and the traveling apron on the deck of the de-

fendants' grain-binder, and show that the packers do not engage with the grain until it has passed below the end of the traveling apron. It would be utterly impossible (and both Steward and Whitney must be aware of the fact) to push the grain endwise by means of this traveling apron after the positively driven and moving packers had clasped its waist and were forcing it against the compressor. The whole work of the traveling apron is necessarily done at a time when it is not acting in combination with any other propelling mechanism, but is acting upon the grain in its free state, intermediate between its discharge from the harvester elevator and its grasp by the packers.

It would be difficult to conceive any greater presumption than that which is exhibited in asking the Court to construe this explicitly limited patent for an abandoned experiment, to cover a machine *which has succeeded because it lacks every peculiarity claimed in the patent.* No one, aside from complainant's experts, ever thought of calling the deck of a binder the main elevator or any part of it. Even Elithorp, one of complainant's own employees and witnesses,who has been in the experimental department of the complainant's factory since 1869, refuses to subscribe to any such absurdity. The following appears in his cross-examination (Transcript of Record, pp. 248–249):

"X. Q. 31—What do you call this device to which I point, in the Winona machine present in the room?

A.—That we call the butting device or adjuster.

X. Q. 32—Do you call it the elevator?

A.—No, sir.

X. Q. 33—Why not?

A.—Because the grain is already elevated before it gets to that device.

X. Q. 34—What do you call this part of the Winona machine to which I now point?

A.—That is the deck of the binder.

X. Q. 35—Is it not the elevator?

A.—No, sir; it is not.

X. Q. 36—Why is it not the elevator?

A.—Because it does not elevate.

X. Q. 37—And in the Winona machine what you have designated the butting device or adjuster is a frame having a revolving slatted canvas upon it, mounted over the forward edge of what you have called the deck of the binder, and is parallel or nearly so to the deck of the binder; is not that so?

A.—Yes.

*By Mr. Parkinson:* X. Q. 38—What do you understand by an elevator?

A.—A machine that will elevate anything.

X. Q. 39—I mean what do you understand by the elevator of a harvester?

A.—The part that elevates the grain from the platform to the binder.

X. Q. 40—Where does the elevator terminate in defendants' machine, for instance in the Winona machine before you?

A.—At the upper end of the binder deck."

When the Olin patent sued upon was applied for, it contained a claim framed to cover the pivoted elevator belt in combination with suitable devices for adjusting the belt or elevator to deliver grain at a uniform point regardless of its length. The third claim was as follows:

"In a harvesting machine, a swinging belt or elevator pivoted at its lower end in combination with suitable devices for adjusting the belt or elevator to deliver grain at a uniform point regardless of its length, substantially as specified." (Transcript of Record, p. 370.)

This claim, it will be noticed, does not recite the combination with the elevator of the harvester, and while not as broad as the complainant is now asking to have his present claims construed, does omit the element which the complainant is particularly seeking to have construed out of the existing claims. This third claim was rejected by the Patent Office, and canceled, and the following substituted in its place:

> "3. The adjustable elevator or belt, Q, having its lower end, *c*, advanced in front of the line of grain travel, in combination with the carrier, arranged as described, substantially as and for the purpose set forth."

This was again rejected, the Office saying in its action upon it (Patent Office letter of November 19, 1878, Transcript of Record, p. 375):

> "The novelty therein is *in the relation of the auxiliary elevator to the main elevator*, and it should appear distinctly in the claim."

The claim was then amended so as to make it read:

> "Arranged as described *in relation to the main elevator*." (Transcript of Record, p. 375.)

The second claim was, at the same time, amended so as to qualify it more definitely in the same respect.

This, of itself, would be conclusive against any interpretation of this patent which gave it even approximately the scope contended for by complainant. Limitations of a claim introduced by the applicant after the claim has been rejected, must be strictly construed against him and in favor of the public.

*Sargent* v. *Hall Safe & Lock Co.*, 114 U. S. 63.

*Fay* v. *Cordesman*, 119 U. S. 408.

In *Shepard* v. *Carrigan*, 116 U. S. 593, the Supreme Court said (p. 597):

> "When an applicant for a patent to cover a new combination is compelled by the rejection of his application by the Patent Office to narrow his claim by the introduction of a new element, he cannot, after the issue of the patent, broaden his claim by dropping the element which he was compelled to include in order to secure the patent."

After citing authorities on this proposition, it quotes from *Fay* v. *Cordesman*, *supra*, as follows:

> "The claims of the patent sued on in this case are claims for combinations. In such a claim, if the patentee specifies any element as entering into the combination, either directly by the language of the claim, or by such a reference to the descriptive part of the specification as carries such element into the claim, he makes such element material to the combination, and the court cannot declare it to be immaterial. It is his province to make his own claim, and his privilege to restrict it."

None of the limitations introduced in the claims of complainant's patent can be disregarded so as to expand it to cover a construction that does not contain all the elements specified. (See *Rowell* v. *Lindsay*, 113 U. S. 97, and cases there cited.)

In *Railroad Co.* v. *Mellon*, 104 U. S. 112, and *Yale Lock Co.* v. *Greenleaf*, 117 U. S. 554, it was held that while a claim may be *limited*, it *cannot be enlarged* by language used in the specification.

## Want of Novelty and Patentability.

If this patent is not taken as limited to the exact combination between the butt elevator and the main elevator of the harvester, exhibited in the drawings, described in the specifications and recited in the claims, the patent is invalid for want of novelty and for want of patentable invention. The language of the specification and claims was selected with a view to distinguish the very limited modification which the patentee has made in the particular combination and arrangement in which the traveling apron or belt was employed. He was not the first to use a traveling apron operating upon the butts of the grain to advance them, and at the same time move the grain endwise over the apron on which it was traveling, but was, so far as the prior patents illustrate the art, the first, (and the last) to apply such an apron on the face of the elevator of the harvester in such position that (in the language of his patent) it had—

> "its pulleys or wheels arranged with their faces parallel with the upper surface of the main elevator, so that it will bear against the butts of the grain and crowd or move the grain back on the elevator toward the center for the purpose of straightening the grain in its passage up the elevator."

An independent traveling apron had before been used to elevate the butts of the grain as the grain traveled up the main elevator, and an adjustable butter had before been used to "move the grain back on the elevator toward the center" so as to deliver grain of different lengths at the same point.

In the Watson & Renwick grain-binder patent of 1853, an adjustable apron had been used for the same

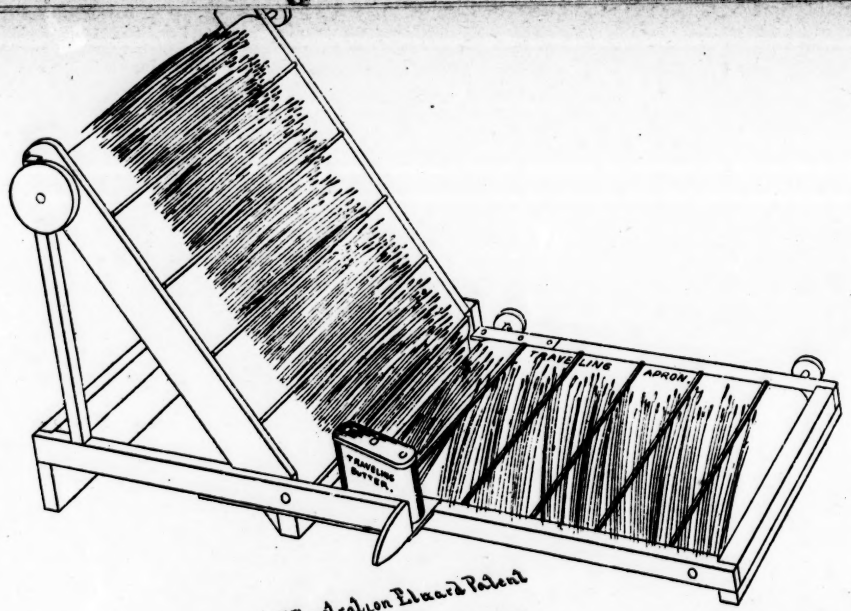



Illustration Edward Patent
No 165.316
Issued July 6th 1875

general purpose as the Olin, though different in character and more practical. (Transcript of Record, pp. 505–506.)

The accompanying illustration of the Elward patent, No. 165,316, shows one earlier form of traveling apron or belt operating upon the butts of grain to move them diagonally on the traveling platform or apron over which the grain is being conveyed, for which a patent issued July 6, 1875. There is a model of the same in evidence, and Mr. Renwick's description of this model is found in the Transcript of Record, pp. 349–351. The traveling butt apron is shown on the harvester platform, set up edgewise, and arranged diagonally, so as to act upon the butts of the grain as they pass over that platform. The traveling apron is mounted on two rollers, one at each end of it, their faces being perpendicular to the face of the horizontal traveling apron of the platform; that is to say, in the same relation to that apron as the rollers of the Olin butt elevator are to the harvester. The patent states that one of these rollers around which the butter apron passes may be driven by proper gearing. The face of the butter apron in this Elward patent, as in the Olin patent, moves in the same direction as the horizontal apron upon which the grain rests, and diagonally across the path of travel of that apron. The Elward patent says (p. 458):

> "Upon the inner shoe, which, together with the elevator, is extended some distance in front of the bar to which the cutters are attached, I place vertical pins or shafts upon which are placed rollers. *g g*, carrying an endless apron, G, set obliquely to the line of the cut with the narrow end or roller nearest the elevator. This apron may be operated either by the friction of the passing butts of the grain or it may be given a positive movement across the

belt and pulleys from any convenient driving shaft, the movement of the apron in either case serving to move backward the butts of the grain projecting over the finger-bar."

The third claim of the patent is for this endless apron in combination with the traveling platform, as follows:

"3. The upright endless apron, G, or its equivalent, arranged at the inner end of the platform, and operating substantially as described for moving the butts of the grain backward to clear the forward guard of the elevator, as set forth."

Of course, in this patent as in the Olin patent, the expression, "moving the butts of the grain backward" means moving the grain longitudinally toward the back of the machine by pressure against the butts.

The Elward patent, No. 177,231, of May 9, 1876, shown in the accompanying cut, has an adjustable butter board mounted on the deck of the grain-binder in the same position and adjustable in substantially the same way as the butting board of defendants' machine.

The Green patent, No. 188,125, of March 6, 1877, shows an adjustable butter for moving the grain endwise while ascending the harvester elevator. It is shown in the accompanying illustration of the Green patent, the butter being capable of precisely the same adjustment as the Olin elevator, this adjustment being indicated by dotted lines. The Green patent describes it as a grain guide, and says:

"T designates a grain guide, which is pivoted at the lower front corner of the elevator frame, on the grain side thereof, and which is provided at its upper end with a handle convenient to the driver sitting in his seat.

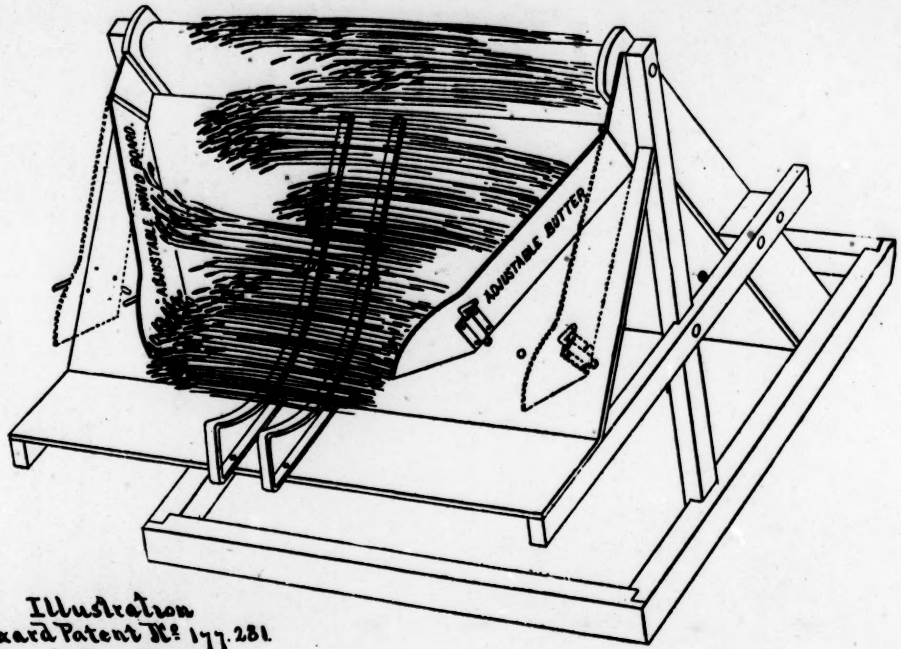



Illustration
Elward Patent No 177.281
Issued May 9th 1876

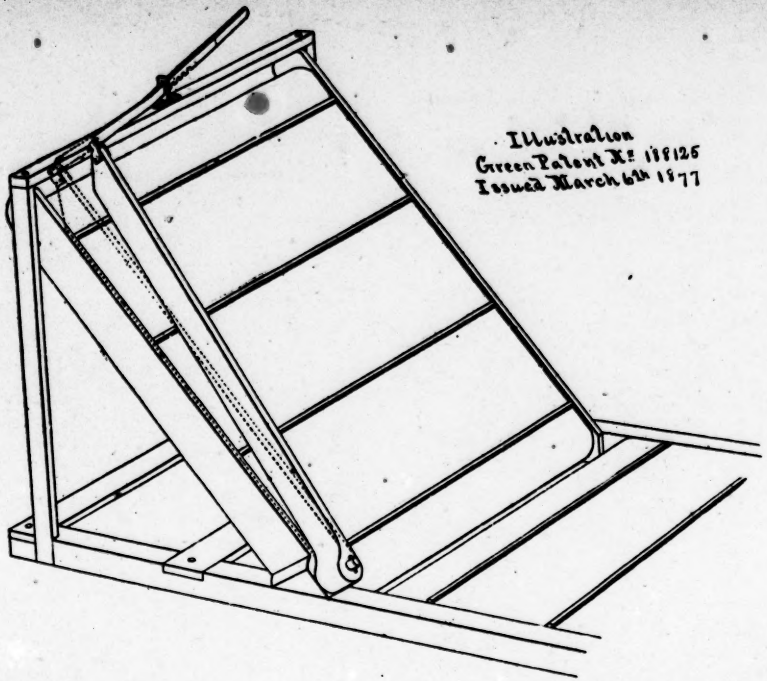
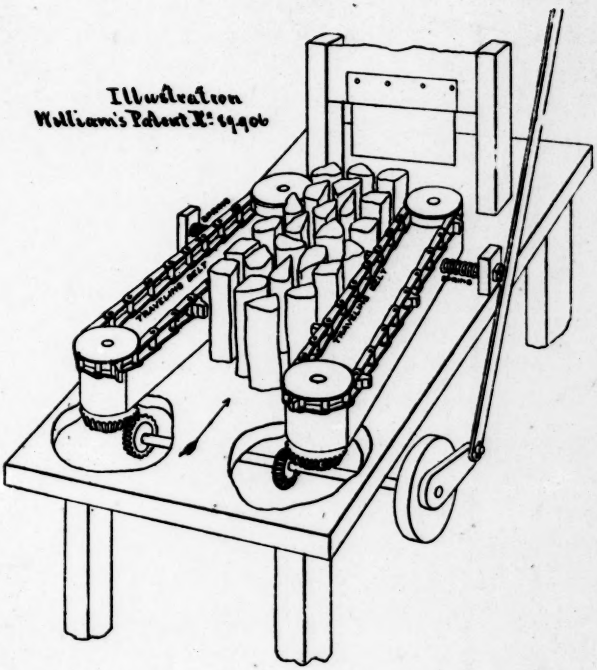


Illustration
Green Patent No 188126
Issued March 6th 1877

Illustration
William's Patent No. 1906



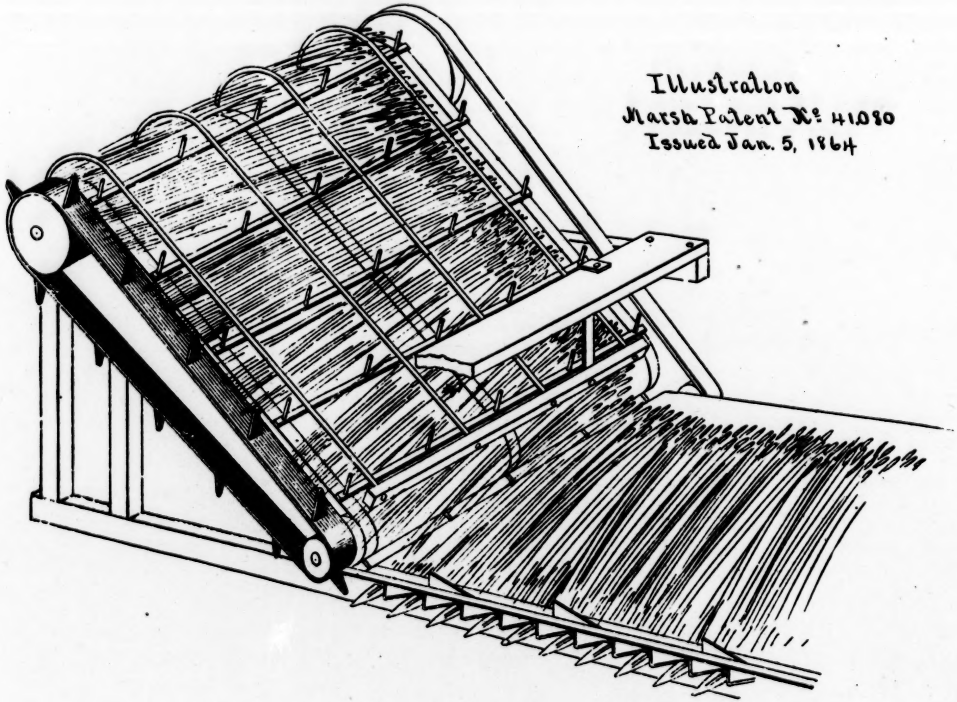


Illustration
Marsh Patent No. 41080
Issued Jan. 5, 1864

"When cutting tall grain, the grain guide, T, is not used; when cutting short grain, in order that it may be bound at or near the middle of its length, the driver moves the upper end of this grain guide, T, backward against the butts of the straw, so that the elevator will deliver the short grain into the receptacle, *n*, in a position to be properly bound by the devices I am now about to describe."

The Williams patent, No. 89,906, of May 11, 1869, illustrated in the accompanying cut, shows two swinging traveling aprons, or chain belts (which are stated in the Olin patent to be the equivalent of the traveling aprons), occupying the same position with reference to the platform or deck from which the material is being fed as does the traveling apron of defendants' grain-binder, and they have provision for both elastic and arbitrary adjustment to greater or less angle of inclination toward the center of the platform over which they are feeding. The pulleys or wheels are arranged with their faces parallel to that platform, and the teeth projecting from the chains act in the same path as the traveling apron of the defendants' binder, and for a similar purpose. The Williams patent states that either one or two of these swinging traveling chains may be used.

The Marsh patent, No. 41,080, of January 5, 1864, shows a traveling butt elevator belt applied to the harvester elevator, and describes it as traveling faster than the main elevator, so as to operate upon the butts of the grain to straighten the grain or bring the straw parallel. Its operation is illustrated in the accompanying cut. This elevator belt is claimed in combination with

the toothed apron of the main elevator in the second claim, as follows:

> "The tooth belt, F, in combination with a toothed apron, D, and endless band, B, as and for the purpose set forth."

What Olin did was not to invent a traveling apron so arranged as to work on the butts of grain, or a traveling apron tending to feed in a diagonal path. He simply took the butter apron or traveling belt which Elward had used on the harvester platform to move the grain in a diagonal direction, and transferred it to the harvester elevator, where he applied it in the same position and adjusted it in the same way as Green had applied his adjustable butter, his idea being that in this way he could move the grain laterally at the same time it was being elevated by the elevator apron, so that it would be discharged at either the front or rear of the elevator apron as might be desired for the convenience of the man who stood there to bind it, or of the non-adjustable grain-binder which might be there to receive it. This was the full measure of his invention. It was very trivial in character, of doubtful patentability, and, as it proved, of no utility. The invention was abandoned as soon as fairly tested. It was only when Appleby and Bullock applied a traveling apron to operate upon the grain as it fell in its free state upon the deck of the binder and when it was undisturbed by other propelling mechanism, that any practical advantage was obtained from it, and then the complainant and other manufacturers who had uniformly discarded the Olin combination adopted the Appleby & Bullock under license of Appleby and his associates.

If it was invention for Olin to take the traveling butter from the horizontal platform of the Elward harvester and apply it on the harvester elevator, pivoting it on the harvester elevator at the same place and in the same way as Green had pivoted his adjustable butter there, it was quite independent invention for Appleby and Bullock to take the swinging traveling apron of the Williams patent and apply it on the feeding deck of their grain-binder to serve a similar purpose to that which the Williams swinging traveling apron served on the horizontal deck of the machine in which it was used.

ESTOPPEL.

The Appleby machine with the adjustable traveling apron on its deck precisely as in defendants' machine, is shown to have been built ever since 1877, and to have been extensively on the market since the spring of 1878. It has been manufactured and sold by all the Appleby licensees, without their right being questioned. See Dep. Appleby, Transcript of Record, pp. 19-20, Q. 85 to 93; Bishop, Transcript of Record, pp. 20-21, Q. 45–46; Bullock and Appleby patent of October 31, 1882, Transcript of Record, p. 560, (application filed September 2, 1879.) The fact that the Patent Office allowed the Bullock & Appleby patent with a claim covering specifically the combination now charged to infringe, and that the complainant has recognized the patent by taking license under it, and has never before asserted right to this combination under the Olin patent, is significant.

The fact that the complainant, though selling machines in close competition with the licensees under the Appleby patents for many years, has allowed these licensees to

build up their business, and invest their capital and good will in this Appleby machine, without suggestion that he asserted any adverse right under the Olin patent, is not only strong evidence that he never recognized any embodiment of the Olin invention in these Appleby machines, but it is also an estoppel against maintaining suit in equity for the interruption of a right that has been thus acquiesced in until businesses involving many millions of dollars per annum have been built up by those other licensees. Since the winter of 1877–1878 these Appleby machines with the form of butt-adjuster used by the defendants have been manufactured in large and constantly increasing numbers under claim of right from Appleby, in which claim the complainant has not only acquiesced by asserting no adverse right under the Olin patent, but has further acquiesced by himself adopting and manufacturing the Appleby machines under license from Appleby. See:

*Wyeth* v. *Stone*, 1 Story, 273 (STORY, J.)
*Magic Ruffle Co.* v. *Elm City Co* , 13 Blatch. 151 (161) (SHIPMAN, J.)
*McLaughlin* v. *People's Railway Co.*, 21 Fed. Rep. 574 (BREWER, J.)

All the reasons for the estoppel by laches, which the Supreme Court has applied with such strictness in reissue cases apply with greater force to any effort that may be made to expand a patent by judicial construction, so as to cover a different machine which has been openly, notoriously and extensively manufactured for years with the knowledge of complainant, and without even notice that he claimed to cover it by his patent.

## In General as to the Olin Patent.

The question arising under this patent is not, as assumed in the argument of complainant in the lower court, whether the patentee shall be bound by some inadvertent expression in his claims which would deprive him of the invention set forth in his specification and obviously intended to be embraced therein; it is not whether a mere formal modification of an invention which the public has derived from him shall be allowed to escape through the loophole of some expression inconsistent with the trend of his specification; but it is whether a patent which, in all its parts, from title to conclusion, through its drawings, its specification, and every clause of its claims, with perfect harmony and consistency, with the emphasis of frequent reiteration, and with the concurrence of a great variety of expressions, represents the invention to consist in the particular combination of a *butt elevator* with the *main elevator of the harvester* on the *grain side*, by which the tendency of the butts of the grain to *lag in their passage up the main elevator* is overcome, and the grain is *straightened in its passage up the main elevator*, is to be construed so as to *disregard every term used in the description and claim*, and cover a mechanism as expressly excluded from the patent as if the entire specification and claims were drawn for the purpose of distinguishing the invention of the patentee from it; whether such a patent for a combination whose history shows it impracticable, shall be *transmuted* by judicial construction into a patent embracing mechanism in which there is *no butt elevator, either combined with the harvester elevator or in any other position*, in which there is no means for *elevating the butts of the grain*, no means for

*straightening the grain in its passage up the elevator,* and no means for moving the grain endwise during its passage up the main elevator; a mechanism which not only lacks the *more specific* features recited in the claims, but is entirely destitute of the *fundamental elements* to which the patent is limited by every variety of expression used in it, and whose success has been as unqualified as was the failure of the patented combination.

In *Keystone Bridge Co.* v. *Phœnix Iron Co.*, (95 U. S. 274) the Supreme Court says (p. 278):

> "Since the act of 1836, the patent laws require that an applicant for a patent shall not only, by a specification in writing, fully explain his invention, but that he 'shall particularly specify and point out the part, improvement or combination which he claims as his own invention or discovery.' This provision was inserted in the law for the purpose of relieving the courts from the duty of ascertaining the exact invention of the patentee by inference and conjecture derived from a laborious examination of previous inventions, and a comparison thereof with that claimed by him. This duty is now cast upon the Patent Office. There his claim is, or is supposed to be, examined, scrutinized, limited, and made to conform to what he is entitled to. If the Office refuses to allow him all he asks, he has an appeal. But the courts have no right to enlarge a patent beyond the scope of its claims as allowed by the Patent Office, or the appellate tribunal to which contested applications are referred. When the terms of a claim in a patent are clear and distinct (as they always should be), the patentee, in a suit brought upon a patent, is bound by it. (*Merrill* v. *Yoemans*, 94 U. S. 568.) He can claim nothing beyond it. But the defendant may at all times, under proper pleadings, resort to prior use and the

> general history of the art to assail the validity of a patent or to restrain its construction. The door is then opened to the plaintiff to resort to the same kind of evidence in rebuttal; but he can never go beyond his claim. As patents are procured *ex parte*, the public is not bound by them, but the patentees are. And the latter cannot show that their invention is broader than the terms of their claim; or, if broader, they must be held to have surrendered the surplus to the public."

In *White* v. *Dunbar*, 119 U. S. 47, the Supreme Court says (p. 51):

> "Some persons seem to suppose that a claim in a patent is like a nose of wax which may be turned and twisted in any direction, by merely referring to the specification, so as to make it include something more than, or something different from, what its words express. The context may, undoubtedly, be resorted to, and often is resorted to, for the purpose of better understanding the meaning of the claim; but not for the purpose of changing it, and making it different from what it is. The claim is a statutory requirement, prescribed for the very purpose of making the patentee define precisely what his invention is; and it is unjust to the public, as well as an invasion of the law, to construe it in a manner different from the plain import of its terms. This has been so often expressed in the opinions of this Court that it is unnecessary to pursue the subject further."

The cases with which the Court was dealing in the passages above cited did not remotely approach in their extravagance the propositions for which complainant is contending here. There is no expression, from the beginning to the end of the long specification of the Olin

patent, that suggests any broader construction to that patent than one which limits it to the special combination of a *butt elevator and main elevator*, arranged and co-operating as described. The language used by Olin throughout corresponds exactly with the mechanism with which he is dealing. The harvester which he shows in his drawing had a traveling apron that moved on a horizontal plane, a traveling apron that elevated the grain from the lower to the upper deck, and a platform upon which the grain fell to be bound. The term *harvester elevator* was the appropriate term to *distinguish* the part of the machine where the grain was being *elevated* from the part of the machine where it was *being moved in a horizontal plane*, or was *falling freely*, or was being *guided into the binding mechanism*. Having before him these different movements of the grain, and the means by which each of them was effected, it was perfectly obvious to him that if he wished to claim the use of a traveling apron that operated to move the grain endwise, irrespective of whether it was applied when the grain was *ascending* or when the grain was being *moved in some other direction*, he must claim it in terms that would not *discriminate* between the *elevating mechanism* and the *mechanism which propelled the grain in other directions*. He not only made this discrimination in terms, but he multiplied epithets and expressions to characterize operations and effects that were due to the fact that the grain was being *raised* instead of being merely *moved*. So, too, when dealing with the butt elevator. He distinguished in a variety of ways between the mere *traveling apron operating upon the butts of the grain* and a butt *elevator*, emphasizing the office which this butt elevator performed in overcoming the tendency of the heavier butts to lag,

(a tendency due to the fact that they were being *raised* instead of moved in some other direction), and reiterating the fact that this office is performed *during the passage of the grain up the main elevator.* The significance of these distinctions is increased by the fact that it was at that time old (as illustrated in the Elward patent) to apply a traveling butter apron to move the grain diagonally along a traveling horizontal apron, and that it was also old to use a traveling apron operating sidewise on a horizontal table and made adjustable to different angles to guide the material to a more or less inclined path, (as illustrated in the Williams patent), so that the specifically and often reiterated limitations to this patent were obviously made with reference to emphasizing the distinction between the older applications of the traveling belt and that which was being made by this patentee.

What the complainant is asking the Court to do is not merely so to construe the claims as to reconcile them with the mechanism with which the patentee was dealing, for they correspond exactly with both. The Court is rather asked to construe the patent in total disregard of its terms and of the combination upon which it is based, so as to cover an organization as distinct in character as it is in history from that with which Olin was dealing, and as clearly excluded from the description as well as the claims of the patent, from beginning to end, as if the patent was drawn with the sole purpose of avoiding it.

Complainant's contention is fairly expressed by the construction which the complainant's expert, Steward, insists should be given the claim, which is quoted in

complainant's brief on the hearing below, and furnished the text of complainant's argument, as follows:

> "I am clear in my opinion that Olin is entitled to a construction as broad as this: an elevated platform for receiving the grain, means for placing and securing the bands around the bundle, and a rotating adjustable device for determining the position of the band around the stalks of grain."

This *omits every element* of each of Olin's claims, and makes a claim of *three elements of a grain-binder*, in lieu of the elements which Olin claimed as an *improvement in harvesters*. It not only refers to a *distinct organization*, but to a *distinct machine*. If the Olin patent had been reissued with such a claim as complainant is asking this Court to construe into it, it could not, even in the palmiest days of reissues, have been sustained. The objection to creating such a patent by judicial construction, or rather projecting such a patent from the imagination of an interested witness, is far greater than would be the objection to allowing a reissue; for it is proposed to *create a patent to cover the intervening art, to avoid the surrender*, which is made a condition of a reissue, and levy tribute upon the hundreds of thousands of machines that have been made under other patents during the interval, without the slightest suggestion or suspicion that Olin (or rather his assignee) was ever to lay claim to any such invention.

The "means for placing and securing the band around the bundle" (which Steward makes one element of the claim which he insists should be construed into the Olin patent) is *neither shown nor mentioned in that patent*. It does show "an elevated platform for

receiving grain," but, instead of making that an element of the claim, takes pains to state that this butt *elevator* is to be placed on the "*grain side of the machine for elevating the butts of the grain*," the grain side of the machine being the opposite side from that on which the elevator platform is shown. It also states in terms that this butt elevator is to be so placed as to "*engage with the butts of the grain on the roller, I, and carry them up while the heads are being carried up by the elevator belts, M*," the roller, I, *being that between the apron of the harvester platform on the grain side of the machine, and the bottom of the elevator.*

It further says in the same connection:

> "The lower pulley, *c*, is to be so arranged that it will permit the teeth, *b*, on the elevator, Q, to clear the end of the roller, and engage the butts, and this pulley, *c*, is located as close to the main frame as is possible, and permit the operation of the butt elevator, which location of the pulley brings the *butt elevator in position to enable it to catch any short grain, which short grain is liable to fall down, and be caught by the heel of the sickle, and clog the sickle.* By locating the lower pulley, *c*, of the belt, Q, at the proper distance above the main frame, A, *the teeth, b, on the elevator will come in contact with such short grain, and force it forward onto the carrier platform, thus keeping the heel of the sickle clear at this point.*"

The senior counsel for complainant in the court below argued that the reference to the main elevator, to the butt elevator, and to the various adjustments that were dependent upon their relative arrangement and co-operation, were all mere careless uses of expression, and were

not to be taken in the ordinary sense of the language used; and undertook to avoid the force of the specific statement that the butt elevator "was applied to the main elevator on the grain side of the machine for elevating the butts of the grain," by saying that he (counsel) called either side of the machine the grain side. It may be that a like position will be taken on the argument of this appeal.

It is quite evident that complainant's experts, at least, call every part of the machine just what the emergencies of the case require, without any reference to either their office or their recognized names, or their relationships. But no amount of sophistry can make it appear that when Olin said specifically, "*the grain side of the machine*," he did not mean that side as distinguished from what is commonly called the *stubble side of the machine*. He used the term to distinguish the side of the machine to which he was referring, and used it correctly.

Whether counsel also construes the emphasis that is given to the fact that the *butt elevator takes the short grain off the sickle* (which exactly describes the device with which Olin is dealing), to have been intended to refer to some element of a grain-binder doing a work peculiar to that machine, is not explained; but it would take no greater stretch of language to substitute for the sickle any element of any kind of a machine that might serve the immediate purpose of the advocate, than has been used in dealing with the terms of this patent.

*The grain deflector of defendants' machine is so applied that it can never exert its propelling force in such a manner as to lift the grain, and its office in that machine is due to the fact that its action on the grain is ex-*

*erted when the grain is not being acted upon by an elevator.*

Again, it was argued in the court below that the Olin machine would not lose its character if it were traveling down hill instead of up hill, implying that it might travel down hill at such an inclination that what is termed the elevator would point downward instead of upward, and that the action of both the main elevator apron and the butt elevator apron would be exerted in a downward rather than an upward direction. It would be sufficient answer to this argument that it proceeds under the assumption that the *relative arrangement of all the agents in the machine remains the same as shown in the Olin patent*, and their *mutual operation* upon the grain is unmodified, while in defendants' machine the organization is not the same, but essentially different. But there is a more radical answer. The very illustration used serves to show the fallacy of the argument that the direction in which the agency of the elevator is exerted is immaterial. If the Olin machine should travel on a declivity such as would cause the elevator to point downward instead of upward, *neither the main elevator of the machine nor the butt elevator would operate upon the grain at all.* The grain would fall from the lower platform of the harvester before it passed within the grasp of either elevator. This will be illustrated by taking the model of the Olin machine and turning it into a position in which the inclination of the two elevators will be downward instead of upward. If by any possibility a portion of the grain reached what is, in upright position, the top of the main elevator (but would, in its inclined position, be the bottom), the grain would not be delivered to the binding platform, but would *fall in the opposite direction.*

Turning to the defendants' machine, it will be seen that any tipping of that machine so that the action of the grain deflector on the binder platform should be upward instead of downward, would render that machine inoperative. The grain would not be brought into contact with the deflector nor guided by it into the grasp of the packers. In the Olin machine the main elevator and the butt elevator *can only perform their office when the force of gravity is operating in opposition to their movement.* Defendants' machine is equally dependent for its operativeness upon the fact that *gravity is acting upon the grain in the direction toward which the traveling apron exerts its propulsion.*

Olin has set forth his invention by metes and bounds. His description corresponds exactly with the combination which he is describing and his claim distinguishes the butt elevator, combined with the main elevator on the grain side of the machine, from the deflecting mechanism which is employed in the operation of the grain-binder on the stubble side of the machine, where it does not elevate, with the utmost precision. The case here presented is not one in which there has been any inadvertence of expression, or in which the terms of the patent sued upon do not aptly characterize the exact organization exhibited in the patent. There is no ambiguity to be explained by reference to the art. The description and claims correspond *exactly* with the invention made by Olin.

If the reckless disregard of the terms and substance of the patent asked for by complainant were to be adopted, if not only the limitation found in the terms of the claims were to be ignored, but the very characteristics of the elements of those claims, particularly designated and emphasized throughout, were to be construed out of them,

and the organism which the patent, from beginning to end, is framed to exclude, were to be substituted, there would no longer be any use for specifications and claims in connection with a patent; they could serve no purpose, except to mislead the public. The requirements of the statute, referred to in such emphatic language in the decisions above quoted, would be rendered nugatory, and worse than nugatory. Claims would serve simply as a disguise, to lull suspicion until there should be an opportunity to stab some industry that had been built up without warning of its liability to assault.

It was argued in the court below that the packers of the grain-binder, which crowd the grain down upon trip-hook, *may be called elevators*. No instance can be found in the art in which they ever were so called, and it is certain that Olin did not refer to them as elevators. His designation of the *grain side of the machine*, as well as every other term used, show this. They are not parts of a harvester, but parts of a distinct machine. They do not *elevate*, but simply *compress* the grain. Either packers, or some other agency to do their work, had to be used in binding the grain after it was delivered from the Olin harvester elevator, and Olin speaks of this work as being done either by binders (referring to men or boys who bound the grain on the elevator platform), or by automatic binders. The arms of the men or boys would do the work corresponding to what is done by the packers of the Appleby grain-binder, but it was not with these that Olin was combining his swinging elevator. It was with the main elevator of the harvester, so that it would help in *lifting* the grain, also in moving the grain off the sickle, as well as *straightening* it in its travel up the main elevator.

But the deflector of the defendants' machine does not and can not operate to move the grain sidewise after it has been grasped by the packers. It can only do this while the grain is not being propelled by any other mechanism. The drawings made by Steward and Whitney are distorted to misrepresent defendants' machine in this particular. This has already been sufficiently pointed out in an earlier part of this brief.

The fact that Olin was required to amend his specification in the Patent Office, so as in terms to confine his claims to the particular combination and arrangement of the butt elevator and main elevator, has also been referred to in an earlier part of this brief. Such amendments were introduced after rejection in the Patent Office, wherein the Office said:

> "The novelty therein is in the relation of the auxiliary elevator to the main elevator, and it should appear distinctly in the claim."

The action in the interference between Olin and Goodyear shows distinctly that the Patent Office recognized the Olin patent as having no claims which could cover the Appleby and Bullock construction. Goodyear, in an application filed while the Olin application was pending, had made a broad claim to a swinging traveling butter, which, though not corresponding to any claim of the Olin patent, would require specific limitations if the Olin construction were earlier in date. Under the practice then existing in the Patent Office, an interference was declared between this broad *claim* and the *subject-matter* of the Olin patent, the Office recognizing the fact that there was no *claim* of the Olin patent that covered this subject-matter; the practice then being, where two claims interfered, to declare an interference between these claims, but

where a claim simply related to subject-matter which was *shown but not claimed* in another pending application, to declare the interference between the *claim* of the first and the *subject-matter* of the other. The same distinction was made in declaring the interference between Olin and McGregor and Flenniken. (See Olin File Wrapper and Contents, Transcript of Record, p. 377.) Meanwhile, during the pendency of this Olin application, Appleby and Bullock applied (Sept. 2, 1879,) for a patent on the combination of the traveling apron with the table of the grain-binder, exactly as used by these defendants. That patent was allowed and issued with the following claims (Transcript of Record, p. 563):

"2. A deflector or adjuster provided with an endless apron and mounted on or over the receiving table of a harvester, so as to vibrate, for the purpose of adjustment, about an axis coincident with that of the upper and driving roller of the apron, as and for the purpose set forth."

"3. An endless belt moving in the direction of the grain delivery and operating in contact with the stubble end of the grain on its passage from the elevator to deliver it to a binding mechanism, substantially as set forth."

It is under and in accordance with this patent, for what the Office recognized as a distinct invention, that both the complainant and defendants, as well as the manufacturers of grain-binders generally in the country, have been building their machines since they first took license under Appleby.

The comparative history of the two combinations distinguishes them as widely as do the terms of the respective patents, and shows that they have been recognized uniformly as entirely different organisms.

The complainant (upon whose position as one of the largest manufacturers of harvesters and grain-binders so much has been said by his witnesses) owned exclusive title to the Olin patent, and Olin was in his employ when the patent was applied for. There was a clear field for the complainant to put this invention upon the market. The inducement offered by the exclusive title to the patent, and the opportunities given by his extensive facilities, were strongly in his favor. One machine only was made. It was tried in the field. All that is known of it is, that having been tested in the field it was returned to the shop and never used afterward. No other machine was ever made having the combination of the Olin patent. The Olin construction was applicable to all elevating harvesters, of which complainant was at the time selling many thousands. Complainant has continued to make and sell the very type of harvester to which the Olin butt elevator is shown as applied, to the number of many thousand a year, from that date to this, some of them with grain-binders and some without. He has never applied any butt elevator to any of them.

The Appleby-Bullock construction was not owned by any large manufacturer, or anybody having special facilities for putting it upon the market. It was not borrowed from Olin, for it rejected the entire plan of operation upon which the Olin construction depended, and Appleby and Bullock had begun to build it during the fall of 1877, though none were put upon the market until 1878. When the complainant took license under Appleby and began to build the Appleby machine in 1879, he at once adopted the Appleby deflector on the table of the grain-binder, just as it came from the hands of Appleby, and has made it in that way ever since. During the interval

between the application for the Olin patent and the time when he began to build the Appleby machine, he used no traveling apron operating upon the butts in any position. If the Olin construction had been operative, he had not only the advantage of exclusive title to it (affording far greater inducements to build it than any non-exclusive license purchased from Appleby could), but he had the opportunity to build it during the interval before he began to build the Appleby machine, and it was applicable to all his harvesters, of which he was making and selling great numbers; whereas, the Appleby construction was only applicable to grain-binders, of which at that time a much smaller number were sold. Steward, who was complainant's mechanical manager during this time, never read out of the patent the effective combination of the Bullock-Appleby patent which he now insists should be read into it, nor discovered that any useful application of a deflecting apron could be made.

Manufacturers throughout the country have taken and used the Appleby construction, to which they could obtain no exclusive title, while nobody has ever copied the Olin. All of the advantages of condition were with the Olin, and nothing but the fact that the Appleby construction was an essentially different organism, found to be such in operation and recognized to be such by the builders, can account for its complete success, as contrasted with the complete and instant disappearance of the Olin type.

While complainant's experts and counsel use expressions which seem to imply that the patented device has gone into extensive use, these expressions are shown by the cross-examination of their experts to mean simply that the *defendants' machine of the Appleby type* has gone

into extensive use, while they have to confess that no machine with the organism of the Olin patent has ever been sold. Steward testifies (Transcript of Record, p. 198) as follows:

"X. Q. 107—Did Wm. Deering ever build a harvester, or a harvester and binder, and put it on the market, having an adjustable butter apron or butt elevator located in front of the main elevator in the position relative to the main elevator shown by Olin in his drawings?

A.—He did not, that I am aware of, put any such on the market. As explaining Mr. Deering's rights in the matter, taking this question and previous ones into consideration, I will say that Mr. Olin was working for Mr. Deering on a salary at the time the invention was made. He came to the shops and built his first machine—the one from which the model was made for the application. This machine was built by Mr. Deering's mechanics, and at Deering's expense, and was applied to one of Mr. Deering's harvesters (I should have said Gammon & Deering in the matter of the mechanics and the machinery they made.) This was in 1877.

X. Q. 109—What became of that machine?

A.—It was returned from the field after a successful run, as I was informed by Mr. Olin himself, and others, was taken to a store room in that portion of the factory which was burned in the spring of 1879 (as I now recall it), and was destroyed.

X. Q. 112—Did you ever know a machine to be put on the market of the Marsh harvester type having a swinging butter apron, located in front of the main elevator, in the position shown in the Olin drawings?

A.—I think not. The Miller machine is the nearest."

The Miller machine referred to is one which does not

have an elevator, but uses the Appleby grain-binder placed nearly on a level with the harvester platform. It is a machine which has been merely an experiment in the market, and has never been built by either complainant or defendants.

It will be noted that though Olin was in the employ of complainant, he was not called to testify concerning his machine. The fact that it was simply tried in 1877, then left standing in the Deering factory until 1879 (when it was destroyed), while Deering was meanwhile building and selling in large numbers the elevating harvesters to which it is applicable, is the most conclusive evidence that it was not found practically operative to any useful extent. The reasons why it was inherently doomed to failure have already been particularly referred to in this brief.

Whitney, who undertakes to represent that the Olin invention has gone into extensive use, is forced, after much evasion and equivocation, to admit that what he has reference to is the Appleby machine, constructed in accordance with the Appleby-Bullock patent, and that he has never seen or known of a machine having the Olin combination. He testifies as follows in cross-examination (Transcript of Record, p. 261):

> "X. Q. 148—Am I to understand, then, that you do not know of machines being put on the market having an elevator apron or belt similar to that shown in the Olin patent, a binder platform below the upper end of such elevator onto which the grain falls after passing from the control of the elevator, and a swinging elevator pivoted to the lower end of such harvester elevator, and operating on the butts of the grain while being carried up by such harvester elevator so as to be discharged from the

elevator onto the platform below it in the position in which it is to be bound?

A.—No, I do not think I have seen machines put upon the market and operated, containing the features as described in your question exactly."

And again (p. 263):

"X. Q. 165—More than 95 per cent. of the grain-binders sold during the last ten years have been of the elevator or Marsh harvester type, as distinguished from the 'low-down' or platform, have they not?

A.—I would not be able to say what per cent.; but to a great majority of the machines manufactured for the last ten years, I think the designation Marsh harvester would be applied.

X. Q. 166—You should not think the percentage indicated in my question too high, would you?

A.—Probably not.

X. Q. 167—Neither the complainant nor other manufacturers of machines of this Marsh harvester type have, so far as you know, placed on such machines, as put upon the market, a swinging elevator, pivoted at or near the lower end of the harvester elevator, and forming a means for elevating the butts of the grain while the grain was traveling up the main elevator, have they?

A.—No, while they use the swinging butter alluded to, they do not place it as designated in your question.

X. Q. 168—They all use a butter apron on the binding deck in such position that it will not begin to operate upon the grain until after the grain has passed through the control of the main harvester elevator, and so driven that the butter apron would operate in the same direction as gravity instead of in the opposite direction, do they?

A.—To a certain extent this is true, but this butter operates upon the grain to deflect it, or move it laterally. This is one of the most important functions of this butter belt, or apron.

X. Q. 169—They all use it in substantially the same position as the defendants' machine, and as shown in the Appleby & Bullock patent, do they not?

A.—I think they do; however, at present my recollection is not clear as to the patent referred to, but I think it to be in all the essential features the same.

X. Q. 170—They all use it with the butter apron driven downward, rather than upward, so that if the greater weight of the butts of grain tended to throw the grain out of line, the effect of the butter apron would be in the same direction of gravity rather than the opposite direction, do they not?

A.—Yes, the defendants' machine use this revolving swinging butter placed in relation to the flow of the grain with which it engages, parallel, but as relates to gravity, it is partly downward in its position, or, in other words, placed on a decline instead of an incline.

X. Q. 171—The same is true of the complainant's machine and of the other binders of the Marsh or elevator type before referred to, is it not?

A.—I think it is."

Complainant's experts and counsel have devoted much attention to what is referred to as the Miller or Buckeye Low-down Machine, a machine that does not have a harvester elevator, of which the Buckeye company (a licensee of Appleby and Bullock) have made a few, that company building most of its machines with elevators substantially like the defendants', and never combining any butt elevator with the main elevator. It is enough that this "low-

down" machine does not correspond to Olin's patent in any respect, that it has not been made under the Olin patent, but has been made under the Appleby and Appleby & Bullock patents (though not by either complainant or defendants), and that the right of the manufacturer to make it under the Appleby & Bullock patent has never been challenged. It certainly did not occur to Olin, or to complainant, or to his manager, Steward, to use such a machine during the interval between 1877 and the time when complainant began to build the Appleby machine, and it apparently never occurred to them, until this litigation arose, that the Miller machine had any relationship to the Olin patent, or could be treated as an infringement of it. That question is not involved in this controversy.

The limitations of the prior art which led Olin so carefully to confine his patent to the special combination of the butt elevator with the main elevator, instead of claiming broadly a traveling apron operating upon the butts of grain, have been sufficiently referred to in a former part of this brief. It seems hardly necessary to inquire why the patentee so explicitly limited his patent to the particular combinations recited in it, since no condition of the prior art can justify a disregard of these limitations, or an expansion of the patent to cover an organism which has been recognized by the complainant, and by every other manufacturer, as occupying the opposite side of the gulf which divides failure from success.

Traveling aprons operating on the butts of the grain to move it diagonally, and traveling aprons operating upon a feeding table, and adjustable to different inclinations, were both old. Olin undertook to use a traveling apron as a *supplemental elevator*, to co-operate with the main elevator of a harvester, so as to *utilize it at once as a*

*means of lifting the grain and of straightening and deflecting it*, and took a patent for that special combination. The plan was impracticable, was demonstrated to be so by a test, and was abandoned instantly and forever. Appleby and Bullock, with that instinct for success that distinguishes the inventor of machines that live from the patentee of projects that die, applied their deflector to the deck of their grain-binder, *where it could operate upon the grain in its free state because it was not being lifted and was not within the grasp of the harvester elevator*, and where the traveling apron operated in the *same direction as gravity*, instead of in the opposite direction. They did not obtain the *theoretical* advantage of the Olin construction in utilizing the apron as a *supplemental means of lifting the grain up the elevator*, but by reason of not using the apron as an *elevator*, they realized the *practical* advantage of guiding the grain endwise while in its *free state*.

Complainant's brief on the hearing below quotes a passage from one of complainant's experts, representing that the infringement of the Olin patent is not *seriously* disputed. It may be difficult to dispute "*seriously*" a claim of infringement that seems so preposterous, but it is certain that infringement has throughout been disputed with as much explicitness and as much positiveness as the use of the language will admit of. The answer denied it, and Mr. Renwick (defendants' expert) says, very emphatically, that there is no infringement. (See Dep. Renwick, Transcript of Record, pp. 351-353.)

After pointing out the essential difference of organism and operation between the Olin patent and defendants' machine, and showing by reference to the prior art that defendants have not availed themselves of any ideas

which distinguished the Olin construction, but use their deflector in a manner more analogous to earlier patents, he proceeds:

"But, leaving out all reference to prior machines and ignoring them all, it is my opinion that defendants' machines do not contain the inventions referred to in any of the claims of the Olin patent in suit.

*First.* They have no butter which elevates the butts of the grain. On the contrary, they have a depressor belt which causes the butts of the grain to descend.

*Second.* The defendants' butt depressor is not pivoted at its lower end, but at its upper end.

*Third.* The butter of defendants is not combined with a main or harvester elevator which is elevating grain, but, on the contrary, with an inclined deck or chute, on whose surface grain is sliding downward.

*Fourth.* In Olin the upper end of the butter is adjusted, and necessarily so, while in defendants' the lower end is adjusted, and necessarily so.

*Fifth.* In Olin the faces of the pulleys which carry his butter are parallel with the face of the ordinary or main elevator, while in defendants' the faces of the pulleys which actuate the depressor are at right angles to the main or ordinary elevator.

Taking up now the third claim, on points where it differs from the first and second, the elevator of Olin is therein claimed as arranged and described in relation to the main elevator. Defendants' depressor is arranged in a totally different way in relation to the main elevator, and cannot by any possibility operate on grain lying on the main elevator. The fourth claim relates to means for supporting and adjusting the upper end of Olin's butt elevator. There are four elements in this

claim, and it is evident that the defendants do not use this invention, first, because they do not move the upper end of the depressor; and, second, because they only use a simple rod pivoted to the frame of the depressor instead of the four elements of the Olin claim; it being, as I understand, well-known in the patent law that a defendant must use all the elements enumerated in the claims, or equivalent of each of them, in order to infringe, and that a person who only uses one, two or three elements, when four are claimed in combination, is not an infringer.

The fifth claim of the Olin patent relates to means for driving the butt elevator in all the positions in which it may be used. The elements referred to in combination in this claim are those applied to the butt elevator when it is driven from the end, swinging the end which moves in the arc of a circle, and are unnecessary when the butt elevator, Q, is driven from the end on which it is pivoted, the patent stating that it may be driven from this pivoted end. The defendants drive their depressor from the pivoted end. They have not the sliding frame, *i*, of this claim. I have before said that I cannot understand the description of the apparatus referred to in this claim, but I know that the defendants do not need nor use this sliding frame, but, on the contrary, they use the well-known means for driving a belt which can be adjusted or swung on one of its pulleys, described and shown in the patent to W. L. Williams, May 11, 1869, consisting of a mitre gear attached to the shaft of the pulley on which the belt is pivoted, and another mitre gear mounted on a driving shaft, without employing any sliding-box, for which there is no necessity when the elevator is driven from its pivoted end.

The sixth claim of Olin refers to the same combination as the first, of the butting eleva-

tor, Q, with the main elevator, with the addition to the combination of the board, R. I have already said that the defendants have no butt elevator, nor even a butt depressor in combination with the main elevator apron; neither do they use the board, R. They do use a supplementary belt which holds the grain down upon the main elevator belt and overlies it through its whole extent, but this is an old device, known long before Olin. The great use of this device is to confine the grain upon the teeth of the main elevator belt and prevent it being blown away by the wind. Such a belt may be seen in the patent to Watson and Renwick, of 1853. In my opinion the defendants do not use the combination set forth in the sixth claim.

I understand that complainant's expert has stated that the piece of tin which overlies the upper part of the deck of the McCormick model and the piece of sheet-iron occupying this same position in the Winona machine are the equivalent of this short board, R, overlying the elevator apron. Now, the rods, $S^1$, which are bent at their upper ends over the binding platform of the Olin machine, do perform, in a measure, but not fully, the duties of the piece of tin and sheet-iron in the defendants' contrivance, but these rods are not referred to by themselves or in combination in any of the Olin claims, probably because Mr. Olin knew they were described in patents long prior to his patent.

Q. 19.—So far as you know, has any grain-binder having a butt elevator combined with the grain elevator, substantially as exhibited in the Olin patent, been in practical use or on sale by the complainant, or anybody else?

A.—To my knowledge, no such binder has been in use or on sale.

Q. 10—Complainant's expert refers to the packers which compact the gavel in the de-

fendants' machine as a part of the grain elevator; please state whether or not this is correct. Also, whether the term 'elevator' had, at and prior to the date of the Olin patent, a definite significance as applied to grain-binders, and, if so, to what element of the machine it refers?

A.—The packers are not an elevating apparatus; but, on the contrary, a depressing apparatus for forcing the grain downward on the deck; moreover, the packers do not begin to act upon the grain to aid its descent until the grain has been nearly or entirely shoved over by the depressor crowding it endwise. The term 'elevator' had a definite significance as applied to grain-binders long prior to the date of the Olin patent, and this term applied to the belt or belts, or their substitutes, which elevated the grain from the horizontal platform where it was deposited by the cutters and carried the grain over the top of the driving grain."

In addition to the authorities hereinbefore cited, the attention of the Court is respectfully called to the following as strongly fortifying the defendants' position with reference to the Olin patent:

Walker on Patents, 2nd Edition, 144–145.

Robinson on Patents, Sections 504, 505 and 506.

*Vance* v. *Campbell*, 1 Black. 427; 7 Brodix, 117.

*Shumacher* v. *Cornell*, 96 U. S. 549; 11 Brodix, 443.

*Yale Lock Mfg. Co.* v. *Sargent*, 16 Brodix, 264, 271 and 272.

*Snow* v. *Railway Co.*, 17 Brodix, 76 and 94.

*Williams* v. *Stolzenbach*, 23 Fed. Rep. 39.
*Onderdonk* v. *Fanning*, 9 Fed. Rep. 106.

The foregoing is almost wholly an adaptation of the briefs, original and supplemental, for the defendants (so far as they relate to the Olin patent) used on the hearing in the lower court, and prepared by Mr. R. H. Parkinson, of counsel of the McCormick Harvesting Machine Co. The supplemental brief was filed after the argument, and in some instances discussed afresh, in amplified form, certain matters which had been touched upon more or less fully in the original brief. It has been deemed better, in linking the two briefs together, to risk occasional repetition rather than to attempt to cure it by general revision.

## The Steward Patent No. 272,598.

This patent contains twenty-one claims, of which, as before mentioned, only the last two, claims 20 and 21, are charged to be infringed by the defendants on this appeal. In order that the Court may understand the subject-matter of these two claims, only a small portion of the specification need be examined. The butt-adjuster used by the defendants and by the complainant consists of a traveling canvas apron having slats, mounted on rollers at the front edge of the binder-deck, the upper roller being turned by gearing and being pivotally mounted so that the butt-adjuster may be swung to different angles, all as fully explained in the foregoing argument relating to the Olin patent, and as illustrated in several of the preceding sketches as well as in the drawing of the Steward patent under consideration. It has been found expedient to append to this butt-adjuster

a board extension to bear against the butts of the sheaf of grain after it passes the butt-adjuster proper, and while it is being acted on by the binding mechanism. In practice two forms of this extension of the butt-adjuster have been used; one consisting of a board or sheet-iron plate *rigidly* secured to the butt-adjuster at its lower end, and the other consisting of such a board or plate *pivotally* connected to the butt-adjuster at its lower end, and connected to the binder in such a way as to cause it to remain "parallel with itself" (to borrow the expression commonly used with reference to the axis of the earth) in the various positions which it assumes. In other words, when the pivotal form of extension is used the connections are such that while the angle of the butt-adjuster with the top, for example, of the binder changes, the angle of the extension and the same part remains constant, or nearly so. Accuracy is not important, more or less variation in the angle of the extension being practically immaterial; so that under ordinary circumstances a rigid extension to the butt adjuster is quite as useful as a pivoted one; but there are occasions in practice when the butt-adjuster has to be shifted inward to such a considerable degree that the extension, if both rigidly connected and *in line* with the butt-adjuster, might reach to the binding mechanism unless given the capacity of maintaining, or approximately maintaining, a uniform angle, and in such cases the pivotal form has advantages. It should be mentioned, however, that the shifting of the butt-adjuster inward to a considerable degree is seldom, if ever, resorted to, because in binding very short grain it is found preferable to shift the binding mechanism forward instead of shifting the butt-adjuster far backward; and in all

modern machines, including both the complainant's and defendants', the binding mechanism has this shifting capability. Moreover, the rigid extension may be fixed originally at such an angle with the butt-adjuster as to adapt it for all ordinary deflections of the latter. This explanation is given in order that the Court may understand that the rigid extension of the butt-adjuster is practical under all conditions, though under some conditions the pivotal extension is preferable. This is fully in accord with the testimony of Mr. Bates, complainant's expert—See X. Q. 322, and the answer thereto, (Transcript of Record, pp. 96–97), which are as follows:

"X. Q. 322—Now turning to the Steward patent, No. 272,598, of Feb. 20, 1882, suppose the adjustable frame carrying the butt-apron of the Winona machine were provided simply with a board extension rigidly secured to it so that its angle would always be co-incident with that of the butt-apron, which clause (claim), if any, of the above-named patent would that construction infringe?

A.—Within narrow limits of adjustment such a board would perform all the functions of Steward's board, *d*', and in the same way. Beyond those limits it would render the machine inoperative. The adjustment, however, beyond those limits might be effected by moving the entire platform and binding mechanism, just as is now done when it is desired to make an adjustment beyond the capacity of the butting apron. Therefore, such a construction, if it infringe any claim of the patent, would infringe the twentieth (20) claim. In my opinion, such construction would, within the operative limits, contain the combination of said twentieth claim."

Claim 20, charged to be infringed by these defendants, is as follows:

> "20. The combination, in a grain-binder, of moving butt-adjusting mechanism and the board $d^1$, substantially as described."

Referring to the specification for a definition of the board $d^1$, we find the following:

> "$d^1$ is a thin board or plate of metal, as wide as the adjusting canvas, and pivoted to the frame of the latter at its lower extremity. From this board reaches upward and inward (see Fig. 3) an arm $d^2$. The board and frame are as one piece; but the board itself is made in two parts, so that its greater portion (which is the lower) can be removed.

It will be seen that claim 20 mentions only two elements of a combination, namely, butt-adjusting mechanism and the board $d^1$. Mr. Bates interprets the claim as covering any board or metal plate extension rigid with or pivoted to the butt adjuster, provided that, if rigid, it is used within operative limits. What the patent intended to cover by claim 20 can only be surmised. If, by "the board $d^1$" is meant a board *rigid* with the butt-adjuster, the combination is a complete one, and the claim is for an operative mechanism; but if by "the board $d^1$" is meant a board *pivoted* to the butt-adjuster, the combination is incomplete and inoperative, the necessary element of the means which hold and control it being lacking in the claim. If the claim is to be construed by the specification, either the additional elements, namely, the arms $d^2$, $d^3$ and $d^4$ must be read into it, making it the same as the twenty-first claim, or the novelty of the claim must be made to depend on the stated peculiarities of the board $d^1$.

The specification says "the board $d^1$ is made in two parts so that its greater portion (which is the lower) can be removed."

*Day* v. *Fair Haven & Westville R. R.*, 132 U. S. 98–103.

Claim 21 is in the following words:

"21. The combination of the swinging butt-adjuster, the arms $d^2$, $d^3$ and $d^4$, and the board $d^1$, pivoted to the swinging butt-adjuster, substantially as described."

This claim is for a definite, complete and operative combination, except that it omits as an element some means for holding the device in the position to which it is adjusted, and without which it could not keep its place. The foundation for it is found in the specification on page 8 of the Transcript of Record, and is as follows:

"Near the end of the arm $d^2$ is pivoted the bar $d^5$, connecting the arm $d^2$ with the over-reaching arm $d^3$ near its top. In this arrangement we have four pivots, numbered 1, 2, 3 and 4. The distance between 1 and 2 is equal, or nearly so, to that between 3 and 4, and the distance between 1 and 4 to that between 2 and 3. In effect, then, the parts D $d^2$, $d^3$ and $d^4$ describe a quadrilateral having substantially equal and parallel sides, so that to whatever point the frame D is swung in its adjustment, the arm $d^2$ will remain parallel with the fixed arm $d^3$, and the board $d^1$ will always remain parallel with the edge of the decking close to and over which the whole vibrate.

$d^5$ is a connecting-rod pivoted at $d^6$ to the frame D, the adjustment of which it controls, and reaches upward and backward over the decking, passing near the top rail $A^3$ of the harvester-frame. It is provided with the

holes $d^1$ at a point where it passes the top rail, in which latter holes are also provided, so that by means of a pin passing through one and entering the other the whole device can be secured in any position; but it must be remembered that this means for securing the parts in place is but for use in special cases, which will be hereinafter pointed out.

The board $d^1$ is of such length as to reach as low as the accumulating gavel and prevent the grain forming it while accumulating from working or jarring forward. The butting or adjusting mechanism is given an amount of variation in its adjustment from a line parallel with and over the front edge of the chute-board to a point so far backward as to carry short grain sufficiently far back to be bound centrally. Three positions are shown in Fig. 4."

The defenses are:

(1) That claim 20 is void as being for an incomplete and inoperative combination, and if completed by reading into it the necessary elements from the specification, the defendants would not infringe;

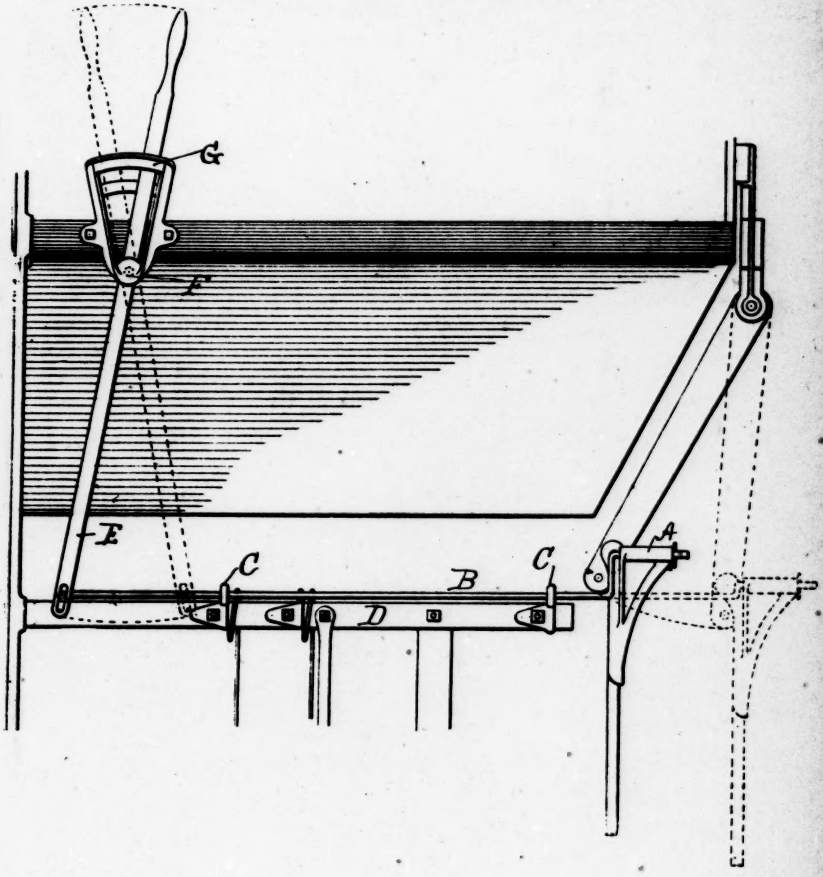
(2) That claim 21 is not infringed by defendants' machine; and

(3) That both claims are void because Steward was not the first inventor, and because substantially the same device as that shown and described in the patent and referred to in the claims was in public use in the United States more than two years before the application for a patent was filed.

In order that the Court may clearly understand the grounds upon which the defense of non-infringement is based, a drawing of the swinging butt-adjuster, board

extension and operating mechanism therefor, as they exist in connection with the binder of defendants' machine, is herewith presented. An examination of this drawing will show that the pivoted board extension of the butt-adjuster has rigid with it at its upper end a horizontal socket marked A; that entering this socket and held therein is a horizontal rod B sliding in guides C on the cross-rail D of the machine, so that any longitudinal movement of this rod must move the board extension forward or back over the deck according to the direction of movement of the horizontal rod, and with it the swinging board adjuster, since the latter is pivotally connected with the board extension; and furthermore that since the rod B is permanently horizontal and is fixed with the rigid horizontal socket at the upper end of the board extension, the latter must, of necessity, throughout all of its movements maintain a position at right angles to the actuating rod. It will be seen that the horizontal rod B is bent into the form of a crank where it enters the socket, and that it turns freely in its guides, thus permitting the slight up and down movement of the board extension which are incident to the adjustment. The butt-adjuster changes its angle as the actuating-rod is moved forward and back, for obvious reasons. It will also be seen that in order to adjust the butt-adjuster and the extension thereon all that is necessary is to impart longitudinal movement in the right direction to the horizontal rod which moves in guides on the cross-rail of the machine. As this is intended to be done by the man who occupies the driver's seat, it is desirable that the horizontal rod be moved by some sort of an agent within his reach. As used in the defendants' machine, the rod is moved longitudinally by means of a

Winona extension to butt-adjuster as in defendants' machine, and charged to infringe claim 21 of Steward patent. Rod moved by lever of the first class.



lever, E, extending from the end of the rod, to which it has a slot connection, up to a point convenient to the driver, and fulcrumed at a point, F, between the point of its connection to the rod, B, and the handle which the driver grasps. The lever, E, has a stud on its face which engages with a rack on the rear side of the curved top, G, of the bracket at the ridge of the machine, and serves to hold the lever in any position to which it is set. Obviously, there are numerous mechanical agencies by means of which the horizontal rod which enters the socket of the board extension to the butt-adjuster might be moved forward and back, (such, for example, as a crank shaft operating a rack and pinion), but the simplest and most convenient agent is probably the lever. This construction in defendants' machine is charged to infringe claim 21 of the Steward patent. The grounds upon which the charge is made are stated in the deposition of Mr. Bates in the course of his answer to direct Q. 21, Transcript of Record, p. 2, as follows:

"The twenty-first claim of the Steward patent is in the following words: 'The combination of the swinging butt-adjuster, the arms $d^2$, $d^3$, and $d^4$, and the board $d^1$, pivoted to the swinging butt-adjuster, substantially as described.'

"I have just explained the swinging butt-adjuster and the board $d^1$, in speaking of the twentieth claim. The arms $d^2$, $d^3$ and $d^4$, together with the frame of the swinging adjuster, constitutes a parallelogram whose function is to keep the board $d^1$ parallel to the edge of the chute, or at right angles to the gavel, whatever its position may be. To this end, the arm $d^2$ is secured to the board $d^1$, so that the two are in one piece; the arm $d^3$ is rigid, or as one piece with the machine; the arm $d^4$, with the frame $d$ of the butt-

adjuster joins said parts $d^2$ and $d^3$, so that these remain parallel, and thus all positions of the board $d^1$ are parallel to each other and at right angles to the gavel.

"In the Winona machine there are, as already explained, the swinging butt-adjuster and the board corresponding to $d^1$; there is also in the Winona machine a parallelogram which retains the board parallel in all its positions and at right angles to the gavel; this parallelogram in the Winona machine is composed of the frame of the butt-adjuster, the top or ridge of the machine which corresponds to Steward's $d^4$, and a piece of round bar iron which corresponds to Steward's $d^2$; this latter is connected to the butt retaining board, so that the two are as one piece and the detaining board is kept in its proper position. This round bar in the Winona machine is passed through two eyes on the machine for some reason, probably to overcome the effect of the bend at the end of the bar. These eyes are not necessary to the operation of the device. It would operate better without them, especially if the rod were straight, and if they were omitted the butt retaining board would keep its position at right angles to the gavel by reason of the parallelogram exactly as it does in the Steward patent.

"Therefore, as I find in the Winona machine a swinging butt-adjuster, a butt retaining board pivoted to it and parts forming a parallelogram and corresponding exactly to Steward's arms $d^2$, $d^3$, and $d^4$, I say that the Winona machine contains Steward's invention as set out in the twenty-first claim of his patent No. 272,598."

The absurdity of the above contention will be apparent from an examination of the drawings of the operating mechanisms of the two devices. It will be apparent on a

moment's reflection that the maintaining of the board extension at a uniform angle in the Winona machine does not depend upon any "parallelogram" theory whatever, but results simply from the fact that the board has at its upper end an elongated socket at right angles and rigid with it, and that a horizontal rod sliding in guides has one of its ends secured within this socket. The rod is permanently horizontal, and of course the board extension is permanently at right angles to it. The butt-adjuster and its board are shifted back and forth as required by moving the rod, B, by means of some suitable agent, such as the lever referred to, and manifestly the angle of the butt-adjuster, which is pivoted at its upper end, varies with the shifting, while the angle of the board extension is fixed. It would be impossible to vary the angle of the board extension without bringing the rod B out of its horizontal position, and this is ~~pivoted~~ provided against both by the guides within which the rod slides and by the connection of the rod to the operating lever. Without the operating lever or some other agent within the reach of the driver the device could be adjusted just the same by some one on the ground, but in this case some means would be required for holding the device in the position to which it should be adjusted. Complainant's expert seeks to make the hand lever in defendants' machine one of the elements which complete the parallelogram. This is utter nonsense. This lever has but one function, which is to pull or push the butt-adjuster and its board appendage to adjust them as required and secure them in place when adjusted, and therefore its equivalent is found in the rod $d^5$ having the holes $d^1$, of complainant's patent. The patent says (see Transcript of Record, p. 10) that this rod $d^5$ need not be connected through the arm $e^2$ to the wind-

board $e$, but that it may be secured to the rail by a pin passing through one of the holes $d^7$ into one of the holes in the rail. Therefore, with this construction of complainant's machine, to adjust the butt-adjuster from the driver's seat the pin is pulled out, the butt-adjuster is set to the required position by pushing or pulling on the rod $d^5$, and then the pin is re-inserted where one of the holes $d^7$ chances to coincide with one of the holes in the rail. It is not pretended that this rod $d^5$ forms any part of claim 21. In fact, it is not mentioned as an element of the claim. It is merely the pushing, pulling and securing agent accessible to the driver, and that is all that the hand-lever in defendants' device is. This will be made still more clear by mentally discarding the rod $d^5$ from complainant's patent and also discarding the hand-lever from defendants' device and comparing results. It has never been contended that defendants' device would then contain all the elements of the twenty-first claim, but, nevertheless, it would perform every function that is performed by the elements of that claim. Without the operating rod $d^5$ of complainant's device, and the securing means afforded by the holes and pin, we would have the combination of the swinging butt-adjuster, the arms $d^2$, $d^3$ and $d^4$, and the board $d^1$, pivoted to the swinging butt-adjuster, which are the elements of the combination in the twenty-first claim. Leaving off the hand-lever and its catch mechanism from the defendants' device, we would have the combination of the swinging butt-adjuster, the board extension pivoted to its lower end and provided with an elongated socket at its upper end at right angles to it, and the horizontal crank-rod B secured within the socket and sliding within guide-eyes on the rail. Now, operating these two devices, it will be found that one per-

forms all the functions of the other, though the agencies by which they operate are mechanically widely different. That is to say, if the butt-adjuster of complainant's patent is swung inward or outward the pivoted board extension, though changing its position, will maintain a uniform angle with all fixed parts of the machine by reason of the parallel rule construction afforded by the arms $d^2$, $d^3$ and $d^4$, while in the defendants' device if the butt-adjuster is swung in or out the pivoted board extension will also maintain a uniform angle with any fixed part of the machine, but by reason of the horizontal socket at its upper end which receives the horizontal rod B sliding in guides. With the omissions mentioned (that is to say, the omission of the pulling, pushing and securing rod $d^5$ of complainant's patent and the pulling, pushing and securing hand-lever of defendants' device) each would require something to fasten the parts in their adjusted position or they would not maintain that position.

As to the infringement of claim 21, of course, the question before the Court is: Are the arms $d^2$, $d^3$ and $d^4$ in the defendants' device? and not, Does defendants' mechanism perform the same function as complainant's? Even Mr. Bates, complainant's expert on the *prima facie* case, did not go to the length of holding that claim 21 covered anything more than the specific mechanism that it recites. X. Q. 239 and the answer thereto in his examination are as follows (Transcript of Record, pp. 97–98):

"Does Steward's twenty-first claim in the patent No. 272,598 cover every possible mechanism that might be employed for permitting the driver to shift the angle of the butt-adjuster and at the same time maintain the butt-board in

position substantially at right angles with the grain?

A.—No, sir, not as I understand it."

The above question, it will be seen, is a very liberal one, since it refers to mechanism for permitting the *driver* to shift the angle of the butt-adjuster. As has been explained, however, claim 21 does not include any element which brings the parts under the control of the driver while in his seat, nor even any securing means for maintaining the parts in place after they have been shifted.

The entire cross-examination relating to the twenty-first claim is as follows (Transcript of Record, pp. 97–100):

"X. Q. 324—What is the function of the board extension upon the butt-adjuster?

A.—It is to prevent the grain which goes to form the gavel from working or jarring forward, thus making an unsightly and uneven bundle.

X. Q. 325—Is it essential that the board should be maintained parallel to the edge of the deck?

A.—It should be substantially at right angles with the gavel. The edge of the deck is generally in that position, and therefore it should be substantially parallel with the edge of the deck.

X. Q. 326—Is it not a fact that in the Winona machine the pivoted end of the board extension is socketed to a horizontal rod but [bent] down near its end to accommodate it to the butt-adjuster, and that this rod is moved longitudinally by means of a lever extending from the opposite end of the rod to within convenient reach of the driver, and that the board is maintained in a position substantially parallel with the edge of the deck by

reason of the lateral socket which receives the rod?

A.—Yes, sir.

X. Q. 327—Do you find in the Steward patent a top or ridge to the machine, the same as in the Winona machine?

A.—Yes, sir.

X. Q. 328—Then in the Steward patent the part referred to as $d^3$ is in an oblique strip distinct from the top ridge, is it not?

A.—Yes; it is a separate piece. In the Winona machine the part corresponding to Seward's $d^3$ is not formed entirely of the ridge, but of the ridge together with the other pieces.

X. Q. 329—Does Steward's 21st claim in the patent No. 272,598 cover every possible mechanism that might be employed for permitting the driver to shift the angle of the butt-adjuster, and at the same time maintain the butt-board in position substantially at right angles with the grain?

A —No, sir; not as I understand it.

X. Q. 330—What function does the top or ridge of the machine perform in the Winona machine as one of the sides of the parallelogram to which you have referred?

A.—It is the fixed side of the parallelogram, and as such determines the direction of its opposite, and consequently of the butt-board. If one side were not fixed with reference to the main body of the machine, the parallelogram would be inoperative as a means of preserving the parallelism of the butt-board.

X. Q. 331—What function does the piece $d^3$ perform in the Steward device?

A.—The same function as the ridge in the Winona. It is the fixed member of the parallelogram.

X. Q. 332—Then what function does the ridge or top of the machine perform in the Steward device?

A.—No particular function with respect to this combination. It is simply a part of the frame of the machine, and nothing more.

X. Q. 333—Then it follows that except so far as it is the equivalent of the piece $d^2$ in Steward device, it performs no function as an element of the combination in the Winona machine either, does it not?

A.—That is true.

X. Q. 334—Now, suppose the top ridge in the Winona machine were wholly omitted, what effect would this have upon the operation of the butt-adjusting device in that machine?

A.—The butt-adjuster would operate exactly the same upon the grain, and as for the operation of the butt-board it is immaterial whether you have a ridge pole to form the fixed member of the parallelogram or not. The fixed side is an imaginary line, and it make no difference whether it goes through space or through matter, provided that its ends where the pivots are are fixed with respect to the main body of the machine.

X. Q. 335—Are there any other imaginary elements in the Winona machine which go to make up the Steward combination set forth in claim 21 of the patent No. 272,598?

A.—My last answer means in substance that the side of the parallelogram may be straight or crooked, and its function and mode of operation will be exactly the same. The same remarks apply equally as well to the other sides as to the fixed sides.

X. Q. 336—What kind of a lever is the lever which is employed in the Winona machine to to move the horizontal rod which operates the butt-adjuster and butt-board?

A.—It is one with the fulcrum between the power and the resistance.

X. Q. 337—That is to say, it is a lever of the first class, is it not?

A.—Yes, sir.

X. Q. 338—Suppose that the bar in the Winona machine to which the horizontal rod is connected by eyes were provided with an extension at right angles about in line with the lever, and the lever were prolonged at its lower end and pivoted to this arm below the rod, and the catch mechanism for the lever were placed, say, upon the bar along which the rod moves instead of upon the top or ridge of the machine, what kind of a lever would be employed in that case for operating the butt-adjuster and butt-board?

A.—That would be one in which the resistance would be between the fulcrum and the power; in other words, a lever of the second class.

X. Q. 339—Would the construction I defined in my last question, in your opinion, infringe the 21st claim of the Steward patent, No. 272,598?

A.—For the reason that there would be no parallelogram which would preserve the parallelism of the butt-board, it would not.

X. Q. 340—Now, please state whether you can see any reason why the construction I defined in X. Q. 338 would not operate the butt-adjuster and butt-board just as effectively as the construction employed at present in the Winona machine.

A.—With the aid of the other device in the Winona machine, I should think it would, and I don't see why the machine was not made that way instead of being made in accordance with Steward's claims.

X. Q. 341—In the Winona machine is not the sole function of the lever to afford the driver convenient means for imparting longitudinal movement to the horizontal rod for the purpose of moving the butt-adjuster and butt-board?

A.—I think not. It forms part of the parallelogram for guiding the butt-board. This

is apparent when the eyes through which the bent rod passes are removed, especially if a straight rod be substituted for the bent one. With the bent rod the eyes are desirable to hold the bend upright, as without them it would fall over and disturb the position of the butt-board.

X. Q. 342—Is it essential in the device as as used in the Winona machine that the parallelogram to which you refer should be preserved?

A.—It might be dispensed with, but if it were the butt-board and adjuster would be out of reach of the driver and useless.

X. Q. 343—Would that be the case if the other form of lever which I defined in X. Q. 338 were employed?

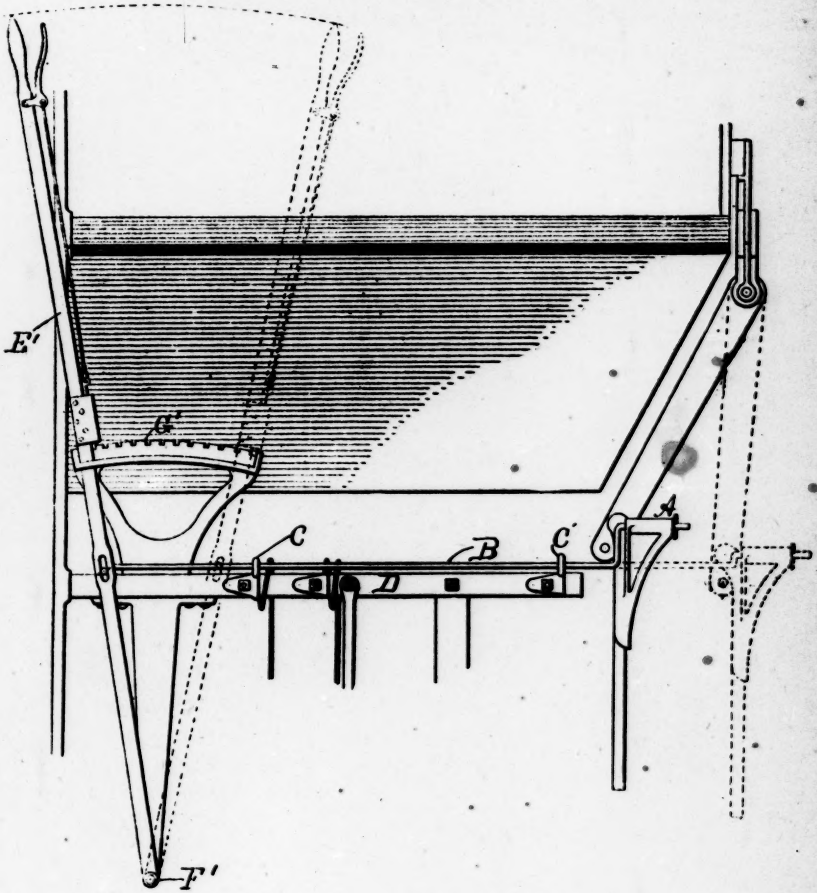
A.—No.

X. Q. 344—Then, if the construction which I defined in X. Q. 338 would, as you say, operate just as effectively as the one at present employed in the Winona machine, why is the feature of the parallelogram an essential one to the device in the Winona machine?

A.—It is necessary to have something to preserve the parallelism of the butt-board. You can use Steward's invention or some other mechanism. The Winona party have chosen to use Steward's invention. It was not essential, for they might have used something else.

X. Q. 345—Now, Mr. Bates, is it not a fact that in the Winona device that which preserves the parallelism of the butt-board, or, in other words, causes the butt-board in its movements always to maintain a position substantially at right angles with the grain, is the horizontal rod and horizontal socket on the upper end of the butt-board which the rod enters, irrespective of the particular agent which may be employed for moving the rod back and forth

Winona extension to butt-adjuster with rod moved by lever of the second class. Conceded by complainant's experts not to infringe claim 21 of Steward patent.



and irrespective of any question of parallelograms, real or imaginary?

A.—Certainly, but the parallelogram is necessary to preserve the parallelism of the rod. The butt-board follows the rod, of course, just as in Steward's patent it follows the piece, $d^2$, to which it is secured.

X. Q. 346—Does the Steward patent show a horizontal sliding rod entering a horizontal socket in the upper end of the butt-board, together with some sort of convenient lever to enable the driver to slide the rod back and forth?

A.—No, sir.

The utter fallacy of the reasoning employed by Mr. Bates to make the language of the 21st claim include the mechanism employed by the defendants could scarcely be better demonstrated than by the answers he was compelled to make to X. Q. 338, 339 and 340 above. Herewith is presented a drawing showing the construction defined in X. Q. 338. It will be seen that, except for the modification of the form of lever by means of which the driver may move the rod, B, forward and back, the construction is precisely that of the defendants' machine. That is to say, the board extension is pivoted to the lower end of the swinging butt-adjuster and has an elongated rigid socket piece, A, at its upper end at right angles with it. Secured within this socket is the crank-shaped rod, B, which slides horizontally in eyes, C, forming guides on the cross-rail, D. To slide this rod forward and back, however, a lever, $E^1$, of the *second* class instead of a lever of the *first* class is used; that is, the lever is fulcrumed to a point, $F^1$, *below* its connection to the rod, B, instead of *above* its connection to the rod, as in the actual defendants' device, previously described, so that to throw the

rod in either direction the handle of the lever is pushed in the *same* direction that the rod, B, is to go, instead of in the *contrary* direction as in the actual defendants' device. G[1] represents securing means for holding the parts in their adjusted position. They might be on the ridge of the machine as before, but the question assumes them to be located on the cross-rail. Mr. Bates concedes that in defendants' machine the lever of the second class above described would operate just as well for sliding the horizontal rod as the lever of the first class actually employed, and no one in his mechanical senses would think of contending that the one is not the full equivalent of the other—in fact the same thing as the other. Nevertheless, the exigencies of the case compelled Mr. Bates to testify that the one form (that in which the lever of the first class is used) contains the combination set forth in claim 21, and that the other form (that in which the lever of the second class is used) does not contain that combination. Thus we are confronted with the mathematical absurdity *that of two things equal to each other, one is equal to a given third thing and the other is not.*

In the rebuttal, Mr. Whitney was called as an expert to corroborate Mr. Bates and Mr. Steward on the "parallelogram" theory of infringement. The tenability of the theory may be gathered from the following excerpts from his cross-examination (Transcript of Record, p. 300):

> "X. Q. 16—Do I understand you to say that in your opinion the Winona machine contains the subject-matter of the 21st claim because certain parts, of which the actuating lever is one, form a parallelogram?
>
> A.—Yes, I believe that is what I have described as the part of a parallelogram in the Winona machine.

X. Q. 17—In the Winona machine does not that actuating lever constitute the medium for pushing and pulling upon a rod which enters a socket secured to the upper end of the extension at right angles to the latter?

A.—Yes, I think this is true as you have described it.

X. Q. 18—And does not that rod upon which the pushing and pulling is exerted slide forward and back in guides which keep it parallel with the lower end of the grain table?

A.—Yes, that is the fact as regards the Winona machine; the guides that you mention are present; however, they are not essential in holding it in place as your question states, the rod being held at one end by the actuating lever and the other end by the socket or thimble connected to the adjuster mechanism.

X. Q. 19—In the Winona machine does not the end of the sliding rod enter a slot in the lower end of the lever which permits to it sufficient play to compensate for the arc described by the lower end of the lever?

A.—Yes, I believe that is a fact. There is some play in the connection; however, it is not essential that the play should be at this point. The play or slack at the pivot point of the lever would answer the same purpose, or slack at either place or both places might be used.

X. Q. 20—But without that play or slack the rod would bind in the guides, would it not?

A.—Yes there would be some cramping if the joints were close fitting, and if the guides that you mention were also close fitting.

X. Q. 21—And if there were no guides to maintain the rod in a horizontal position, and it were connected without slack or play to the actuating lever, the moving of the lever forward and back would cause the rod to describe a compound instead of a single movement, would it not?

A.—Yes, it would cause a slight deviation from a straight line fore-and-aft, as it is located.

X. Q. 22—And since the rod enters a rigid socket in direct line with it such a deviation from a straight line in the rod would produce a corresponding deviation in the board extension from parallelism with the front edge of the deck, would it not?

A.—Yes, I think that is correct.

X. Q. 23—Then does not the Winona device for actuating the butter and extension comprise a rigid socket on the upper end of the extension at right angles with the latter, the horizontal rod movable back and forth within guides and fixed within the socket referred to, and a mechanical agent for permitting the horizontal rod to be moved forward and back by the driver?

A.—Yes, I think that is about the description of it.

X. Q. 24—Then would not any agent which would permit the rod to be moved forward and back by the driver be the mechanical equivalent of this lever; of course I mean any well-known mechanical agent which might be substituted for that lever to produce a like effect upon the horizontal sliding rod?

A.—In order to answer your question and be clearly understood as to what I mean in my answer, I will say first, the horizontal moving rod, to which you refer in the Winona machine is actuated by a lever, to move it forward and back for the purpose of adjusting the butter to various conditions of grain, and this rod at the same time being connected to the butter-extension and sliding parallel with the lower edge of the binder deck holds the butter extension at all times at right angles with the accumulated gavel. As I have said, in this Winona machine the lever is the means employed to correspond with Steward's *d*'. Of

course there would be no other way of attaching a lever to produce the same effect. If the lever were to be cut off at its central pivot point and attached to the butter as in Steward's patent the operation would be the same, the only difference being that a longer piece would be required for the lever thus used and the piece which might be cut off from the lever as now used in the Winona machine. These changes in construction would not involve any change in the principles employed, only making a slight difference in the mode of construction, and this being a matter of choice with the manufacturer. For this reason, I would say yes to your question that it makes no difference where the lever is placed; so long as it produces the same result it would remain the mechanical equivalent.

X. Q. 25—Then it is necessary in the Winona machine that the parts constitute a parallelogram?

A.—Whether it may be absolutely necessary or not may be a question, but that these devices of the Winona machine do produce a parallelogram is a matter of fact in my opinion.

X. Q. 26—Suppose the lever, instead of being so pivoted as to slide the rod by a moving parallel with the butt-adjuster, were so pivoted as to slide the rod by moving in directions contrary to those of the butt-adjuster, would not that be the full mechanical equivalent of the lever, as it exists in the Winona machine?

A.—So far as changing the power or operation of the lever I cannot see that it would make any difference so long as it could be operated to produce the desired result. The fact is that the operating end of the lever, as it is now used on the Winona, moves in the reverse direction of the adjusting mechanism. What I mean by the operating end of the

lever is that part which the operator takes hold of to produce the proper adjustments; when it is moved backward from the machine the adjusting mechanism is moved forward of the machine and *vice versa*.

X. Q. 27—You can readily conceive a mode of pivoting that lever whereby instead of preserving parallelism with the butt-adjuster in its movements it would diverge from parallelism with the butt-adjuster in its movement, can you not?

A.—I think I can.

X. Q. 28—And would it not still operate as a medium for permitting the driver to slide the horizontal rod back and forth?

A.—I think it would, but whether such an arrangement as your question describes might be made practical for this purpose, would, in my opinion, be a question of doubt.

X. Q. 29—Assuming that it might be made practical, would it not constitute the well-known mechanical equivalent of the lever as it exists in the Winona machine?

A.—The only difference in the two levers to which you refer, as I understand your question, is simply a change in the operation of the same lever. In the Winona machine the fulcrum of the lever being between the operator and the part moved, while in the other lever the part moved would be between the fulcrum and the operator. If they are so arranged (the levers) that the part moved by the lever would travel the same distance relatively with the operating end of the lever in each case, then one would be the mechanical equivalent of the other.

X. Q. 30—And yet, in one form the parallelogram, of which you, Mr. Steward and Mr. Bates have had so much to say, would be preserved, and in the other it would not be preserved; is not that correct?

A.—Yes, I think you are correct, and I be-

lieve there has been much said regarding this parallelogram in the record by Mr. Bates and Mr. Steward and something by myself, as you have suggested in your question, but I believe it has been strictly confined to the facts in the case regarding the Steward patented devices and the devices used upon the defendants' Winona machine.

X. Q. 31—Now, Mr. Whitney, if parallelism in the parts is an all-essential attribute in the Steward combination and is not an essential attribute of the Winona combination, how can the two combinations be the same?

A.—Whether it is essential in the Steward device or not it is there, and whether it is essential in the Winona device or not it is also there. The matter of producing a practical butt-adjuster with adjustable extension as in Steward's without the use of the principles employed by Steward has, as yet, not come under my observation."

It has been deemed necessary to enter thus at length into the question of infringement because no argument on this question was made in the lower court, (counsel for the Winona Harvester Works taking no part in the oral arguments), and thus the attention of the court was not particularly directed to the points which have been set forth above. As a result, the court said in his opinion (40 Fed. Rep. 248, Transcript of Record, p. 74): "The Winona Company undoubtedly use the mechanism operating in the same manner, as described in the Steward specifications and claims." Holding as the court did that the subject matter of the 20th and 21st claims was fully anticipated by the Heller butt-adjuster, it is not improbable that the question of infringement was not as fully investigated as it might have been if the decision had in any way depended upon it.

## The Howard & Bousfield Patents, English and American.

The Steward application on which the patent No. 272,598 was granted was not filed until October 9, 1882. On November 28, 1882, the two claims corresponding to claims 20 and 21 of the patent were rejected on English patent No. 4,092 of 1881, which formed a complete anticipation of those claims (Transcript of Record, p. 404.) Thereupon Steward made oath that he had completed the invention and made a working model of it before the date of the English patent, (first affidavit, Transcript of Record, p. 406, second affidavit p. 407), and his application was thereupon allowed without further question. It is an extraordinary fact that these same English patentees, Howard & Bousfield, had pending in the United States Patent Office during the whole time the Steward application was pending, and for ten months before the Steward application was filed, an application for a United States patent for the same thing that is shown in their English patent, and in the Steward patent as the subject of claims 20 and 21. The Steward patent was issued Feb. 20, 1883, and the Howard and Bousfield patent was issued March 27, 1883. That is to say, the Howard and Bousfield application was filed Dec. 12, 1881, ten months before the Steward application was filed (Oct. 9, 1882), and the Howard and Bousfield patent issued a little more than one month after the Steward patent. (See Howard and Bousfield United States patent, Transcript of Record, p. 544.) An examination of this patent will show that it shows, describes and broadly *claims* a device substantially identical with the automatic extension to the butt-adjuster described in the Steward patent

and claimed in the 21st claim. The claim in the Howard and Bousfield patent is as follows (p. 546):

> "1. The combination with the traveling apron for regulating the position of the cut grain on the binder-board or table, D, of the automatically adjustable butting-board, substantially as and for the purpose set forth."

How these two patents issued without any interference is inexplicable. The oath of Steward as to the British patent could have no bearing whatever on this point, and both patents must have been issued inadvertently by the Patent Office. The fact that Howard and Bousfield in England and Steward in the United States hit upon identically the same expedient at almost the same time tends to show how natural it was for Heller (hereinafter to be referred to) to hit upon a like expedient. In fact, the remedy was obvious to anyone recognizing the defect. Seeing that the butts jarred forward after passing the butt-adjuster, the obvious remedy was to provide a barrier extending below the adjuster to hold them back; and the idea of having it maintain a uniform angle automatically would naturally come with the original conception to any one having ordinary mechanical aptitude. Howard and Bousfield's English patent has been omitted from the transcript; but it is an exhibit in the case and does not differ in any material particular from the United States patent.

### The Heller Anticipation.

The application for the Steward patent No. 272,598 was filed October 9, 1882, and Steward claims to have made the invention in the latter part of 1880 and to have had a model of it completed about the month of February, 1881. (Stipulation as to Breuscher, Transcript of Record,

p. 306.) This model is in evidence as "Complainant's Exhibit Steward 1880 Model."

One of the defenses presented against claims 20 and 21 of this patent is that a butt-adjuster extension, operated automatically by a parallel-rule system of arms in every essential particular identical with that shown, described and claimed in the Steward patent, was devised and publicly used by Gottlieb Heller on his farm in Kansas in the harvests of 1877 and 1878. In addition to the automatically adjustable extension, Heller used on the traveling apron butt-adjuster of his binder in the same harvests and subsequently a rigid extension for the same purpose, though he preferred the adjustable one, deeming it the better of the two. Both the rigid and the adjustable extension were seen and understood by several persons whose testimony appears in the record, and the rigid extension was secured to the lower end of the butt-adjuster at such an angle as to cause it to stand at right angles with the butts of the grain, or approximately so, under all conditions that ordinarily exist in the use of a grain-binder.

Edwin D. Bishop, speaking of his visit to Heller's farm in the month of June, 1878, on which occasion he went there as an expert for the harvester company whose harvester and binder Heller had bought, says, in answer to Q. 7, (Transcript of Record, p. 336):

> "I found Mr. Heller and his son, I think it was, in the field, as I remember, of about twenty acres of wheat, nearly all cut. I expressed my surprise at his success, and his answer was that he had no use for experts, that he had taken the binder all to pieces, put it together again, that he understood every part about it and the intention of the inventor. That I could go right along to some one that needed me. He also remarked that he had already made some

improvements, and called my attention to the adjuster and the extension that he had made thereto * * * * * * * This improvement on the adjuster was a piece of sheet-iron fastened to the lower end rigidly, as I remember it, about in such a position that the adjuster would be at an angle of 45° to the butts of the falling grain, and the extension, or improvement as I have termed it, would be perpendicular to the butts of the grain. That is to say, the obtuse angle formed by the butt-adjuster and the extension was an angle of somewhere about 135°. * * * * * * *"

This rigid butt-adjuster was an anticipation of claim 20 of the Steward patent under the interpretation of that claim given by Mr. Bates, complainant's expert on the *prima facie*. (See A. to X. Q. 322, before referred to, Transcript of Record, pp. 96–97.) The question and answer are as follows:

"X. Q. 322—Now, turning to the Steward patent No. 272,598, of February 20th, 1892, suppose the adjustable frame carrying the butt-apron of the Winona machine were provided simply with a board extension rigidly secured to it so that its angle would always coincide with that of the butt-apron, which claim, if any, of the above-named patent would that construction infringe?

A.—Within narrow limits of adjustment such a board would perform all the functions of Steward's board $d^1$ and in the same way. Beyond those limits it would render the machine inoperative. The adjustment, however, beyond those limits, might be effected by moving the entire platform and binding mechanism, just as is now done when it is desired to make an adjustment beyond the capacity of the butting apron. Therefore, such a construction, if it infringed any claim of the

> patent, would infringe the twentieth (20) claim. In my opinion such construction would, within the operative limits, contain the combination of said 20th claim."

It will be seen that the above question prescribed conditions as unfavorable as possible to infringement, these conditions being that the extension should be *in line with* the butt-adjuster, instead of at an angle with it, as Mr. Bishop describes the rigid Heller extension. Of course, if the extension is fixed at such an angle as to be approximately perpendicular to the butts of the grain in the normal position of the butt-adjuster, Mr. Bates have to be even more positive as to its being an infringement (or anticipation) of the 20th claim. In this connection the attention of the Court is again called to the fact that mathematical accuracy is not essential in the matter of this extension. The sole purpose of the extension, as expressed by the patent and by the experts, is to prevent the grain from jarring forward as the machine moves over the rough ground; but evenness of the butts is only found in specially prepared pictures. This will be obvious to the Court upon a comparison of the illustration on p. 158 of the Transcript of Record with the actual photograph (an exhibit in the case) of which it is intended to be a reproduction. The butts of the grain in the hand drawing (p. 158) have been given undue regularity, while in the photograph the irregularity is strikingly conspicuous, and very much greater than any one not familiar with the practical art would expect to see. The hand drawing in this instance shows that the natural tendency of the draftsman toward idealism may be an unconscious one. The photograph, made, as Mr. Steward testifies, with especial care (Transcript of Record, p. 159) bears out

what has been said in this brief concerning the non-importance of accuracy in the angle of the extension with the butt-adjuster much more fully than does the inaccurate hand drawing. The photograph referred to will be submitted to the Court at the hearing. A high degree of regularity has no advantage, nor does it exist in practice. Within considerable limits the board extension may be inclined either way without materially affecting the results.

After the testimony for the defense had been taken, which showed beyond any possibility of doubt that Heller had publicly and repeatedly employed a rigid-extension on his butt-adjuster, and had also applied them for others, Mr. Steward testified and sought to qualify Mr. Bates' testimony that an operative rigid extension would infringe claim 20 of the patent, if subsequent, and hence anticipate it if prior. He says (Transcript of Record, p. 223), that the board, $d'$, of the patent is one so placed as to have its plane always parallel with the sides of the binder table, regardless of its fore-and-aft position and regardless of the position to which the butt-adjuster may be swung; and that it has further a board which shall retain a certain relative position to the delivery end of the butt-adjuster so as to receive the grain therefrom, and to prevent it from charging forward from the position to which it has been carried by the butt-adjuster. On pp. 237 and 238 he testified as follows, under cross-examination:

> "X. Q. 52—Would the device represented in your sketch, No. 24a, whether the connection between the rod, D, and the slotted plate, *g*, is a pivotal connection or not, fall within the terms of the 20th claim of your patent, No. 272,598?

A.—If it would operate substantially as the elements of the 20th claim are required to operate it would; if not, not.

X. Q. 53—Suppose, as you have seen fit to assume in your testimony, that the connection between the rod, D, and the slotted plate, *g*, is a rigid one, and that the slotted plate must be shifted when the butt-adjuster is moved, in order to bring the extension parallel with the edge of the deck, would the device in that case fall within the terms of the 20th claim of your patent 272,598?

A.—I do not know of any limitations of that kind that were imposed in the Patent Office. A mere board below the extension may have been old. If it was, of course that would be a limitation. If it could be shown that that was clearly the equivalent of the board in the patent, then the patent should cover it. If that were prior to the patent, on the other hand, it would limit it.

X. Q. 54—Then have you changed your mind as to whether or not mechanism by which the extension shall be caused to stand parallel with the edge of the deck when the butt-adjuster is moved would be automatic in its operation, in order to comprehend within the term of the patent? [The sense of this question is obscured by clerical errors.]

A.—I have not changed my mind. It should be automatic, but if some one, for the mere purpose of evasion of the patent, made some change that would render the device a little less automatic or a little less convenient, I should consider that his device should come within the terms of the patent. Of course, if the device operated practically the same, because of practically the same means, then it would be practically the same thing."

There are, however, so many qualifications, if not actual inconsistencies, in Mr. Steward's deposition con-

cerning the scope of the 20th and 21st claims of his patent, that fairness to him as well as to the defendants seems to require a reference to the whole instead of to separate parts. His testimony concerning his patent and the relation of the Heller devices thereto, is to be found from p. 214 to p. 245 of the Transcript of Record. As to the infringement of claim 20, the general purpose of Mr. Bates seems to have been to hit if a deer, and of Mr. Steward to miss if a calf.

Gottlieb Heller is a Kansas farmer who was also, for some years following 1880, an agent for a harvesting machine company. He is a man of considerable ingenuity, and has made several inventions in harvesting machines. He bought a combined harvester and twine-binder in 1878, from the agent of the Beloit Co. This machine was an Appleby machine, and had the traveling-apron swinging butt-adjuster precisely as it appears in the complainant's and defendants' machines, and in the Bullock & Appleby patent. He found that when the grain was short and thin it did not work satisfactorily, so he added an extension to the butt-adjuster—first a rigid piece of tin or sheet-iron, and later an extension of sheet-iron and heavy hoop-iron. The latter he made so that it would adjust and keep straight with the butt of the bundle, and in that way it satisfied him. He illustrates this device by a rough sketch, shown opposite page 216 of the Transcript of Record. It is in evidence as Defendants' Exhibit, Heller Sketch. (Transcript of Record, p. 308.) An examination of this sketch will show that it contains every element of claim 21 of the Steward patent, No. 272,598. Mr. Steward, while testifying as an expert, undertakes to show that the proportions of this sketch are such that if accurately

embodied in a butt-adjuster the extension would not maintain its parallelism, and illustrates the result by a sketch, marked 23a and shown opposite page 217 of the Transcript of Record. Very likely he is correct; but the Heller sketch was not intended to serve as a working drawing, but merely to illustrate the nature of the device (Transcript of Record, p. 318, X. Q. 128.) Heller also produced what he represented to be the actual device which he made in 1878 and used publicly in the harvest of that year. The device is in evidence as Defendants' Exhibit Heller Butt-Adjuster with Adjustable Extension, parts 1 and 2 (Transcript of Record, p. 308.) An examination of it will show that, like the Heller sketch, it contains, when complete, every element of claim 21 of the Steward patent. He says it was practically used on his farm in the harvest of 1878 to cut part of two hundred and fifty acres of wheat. If Heller and his corroborating witnesses are believed by the Court, this establishes a complete invention by Heller of the device of the patent more than two years before Steward claims to have completed it, and a public use of it more than four years before the Steward application was filed. As to the anticipation, defendants' expert, Henry H. Renwick, says: (Additional Transcript of Record, p. 23.)

> "The testimony of Gottlieb Heller describes a butt-adjusting apron, mounted like Steward's and others I have referred to, at the upper corner of the binding-deck nearest the horse, and this butting-apron is provided with a link, by means of which it can be set and held at different angles of inclination; and this butting-apron has attached to its lower end a board, which is moved and operated substan-

tially in the same way as the board, $d^1$, of the Steward patent."

In cross-examination (Transcript of Record, p, 313, Q. 79–81) Heller testifies that he also used the device the next year (1879), but that the grain was so short they only used the binder for a brief period, and then took it off and elevated the grain into a wagon; and further, (p. 314–15), that he continued to use it as long as he used the old binder. In 1880 he got a new binder, which the adjustable extension did not fit, and for lack of time he put on a rigid one instead of an adjustable one, though he preferred the latter, and at various times he put on rigid ones for other persons (p. 315.) He also testifies that he urged the company for which he was acting as agent and expert to put his improvements (the one in question and the wind-board, mentioned in the testimony, but not involved in this appeal), on all its machines, and confidently expected that this would be done, but that it was not done (p. 316, p. 318, X. Q. 124, 125, 130.) In answer to X. Q. 138, p. 320, he expresses a very natural suspicion that Steward may have derived the devices of his patent from his (Heller's) prior devices. The question was suggested by a remark of Heller's during the remarks of counsel that precede it, and is as follows, with the answer:

"X. Q. 138—You have this morning stated, off the record, that you would not like to produce your application for a patent already mentioned, for fear that Mr. Steward might take the invention, or words to this effect. In view of this, I will now ask you whether it has not been heretofore impressed upon you that Mr. Steward had really gotten all the inventions mentioned in your testimony, to-wit: The butter-

extension, the wind-board, and the spring-compressor, in some way directly or indirectly from you?

A.—Well, of course I don't know which way he got those things—if he got it from his own mind, or if he got it from mine, while I was not particularly secret with these things. I used it all public, and the things are so much like mine that I cannot help feeling suspicious."

Heller is fully corroborated as to the use of his adjustable extension to the butt-adjuster in the year 1877 by Reinhard Rubin (p. 322), George Heller (p. 330), Edwin D. Bishop (p. 335), and Rosina Heller (Adt'l Rec. p. 12.)

Rubin is a neighbor of Heller's, and in 1878 was an agent for the predecessors of the harvesting machine company that Heller was an agent for later, Parker & Stone at that time (p. 322.) He sold Heller his 1878 machine, and when he went to Heller's farm in the harvest of that year to see how it worked, George Heller, Gottlieb Heller's son, who was running the machine, which was then at a standstill for oiling, called his attention to an improvement in the butt-adjuster, which he said his father had made. He remembers that it was a sheet-iron extension and he identifies "Defendants' Exhibit Heller Butt-Adjuster with Adjustable Extension" as resembling it. He says (p. 323, A. to Q. 15):

"A.—I saw this or something like that before—I saw this on a machine I sold Mr. Heller, as much as I can remember, in the latter part of June, 1878. The adjuster was on the machine and the extension was about in this shape (witness showing the extension slightly deflected out of line with the adjuster.) I do not know how the two were fastened together—don't remember any more."

Under cross-examination he becomes much more definite. He says, p. 324:

"X. Q. 28—When did you first see either of these additions or features?

A.—In the harvest of 1878, in the latter part of June—the second time when I came to look at the machine, which was probably about twelve days after I sold the machine, and had not previously cut very much.

X. Q. 29—How long did he afterward continue to use the machine in the same harvest or season?

A.—He used it the day I was here and I suppose used it until he finished his harvest; about three weeks or more, I suppose.

X. Q. 30—Did you examine the butt-adjuster extension which you say you saw on the Heller machine carefully enough to understand fully its construction and manner of operation?

A.—I looked at the adjuster very closely.

X. Q. 31—But as I understand you, you say that you do not remember exactly how the extension was attached to the adjuster?

A.—I do not remember any more at the present time.

X. Q. 32—Did you see the adjuster or its extension moved at that time, or at any other time?

A.—I did, sir.

X. Q 33—Can you tell exactly how it moved? I am now speaking of this particular adjuster and extension here in the room before you, and which has been offered in evidence as "Defendants' Exhibit Heller Butt-Adjuster with Adjustable Extension."

A.—I can show you how it moved; when the adjuster would be thrown with the lower roller more toward the grain the extension would keep straight toward the butts.

X. Q. 34—How do you remember that?

A.—Why, George showed me, and while we had generally trouble with the wheat, the butts generally fell down there; the spring was not strong enough to hold the butts on the binder; this kept the butts in shape. It was a piece of improvement.

X. Q. 35—How long did you watch the machine in operation at that time, if at all?

A.—When George started up he made about a round, and I watched the machine to see it work. Then I went off to see about another, as much as I remember.

X. Q. 36—Do you remember whether you actually saw the butt-adjuster and extension moved while you were following the machine during that round, or are your statements as to how it worked made from what George told you merely?

A.—Well, when I went around I saw the adjuster on the machine, and saw that it kept the butts in place.

X. Q. 37—But your statements in reference to the extension keeping straight while the lower end of the adjuster was moved inward are made from what George told you, as I understand you?

A.—Yes, some, and while I was going round I saw that when the harvester would shake, the adjuster would move in or out a little, and this extension would keep straight.

X. Q. 38—You say you saw this adjuster with its extension twice during that season. Do you mean that you saw it twice on the same day, or that you say it on two different days?

A.—I saw it on two different days. I don't remember any more how many days there were between; the first time I saw the machine with these improvements on I saw it in the field; the second time I saw it in the yard. As much as I remember he was waiting for his oats to get ripe at that time; I only saw it working once.

X. Q. 39—Do you consider this extension attached to the butt-adjuster as a good thing?

A.—At that time I did.

X. Q. 40—Have you since changed your mind in this respect?

A.—No, sir; if they use that machine now I would think it would be a good improvement.

X. Q. 41—Did you try to have that kind of an improvement put on any of the other machines sold by you?

A.—That year it was too late to put any of the improvements on, and I did not know whether I would be agent next year. I did not try myself. I told Heller to write to the company about having the improvements put on the machine.

X. Q. 42—Are you not aware that Heller made many different forms or experiments in reference to this butt-board extension feature?

A.—Well, this is the one I saw on.

X. Q. 43—Please answer my question.

A.—He told me he did make one more, and I saw it, too.

X. Q. 44—When did he make it?

A.—He made it the same year.

X. Q. 45—Before or after he made the one here in evidence and now in the room before you?

A. –I saw this one on the machine, and the other I have not seen on the machine. As much as I remember, he made it after he made this one. He surely could not have it before, for I saw this one on the machine pretty soon after he commenced cutting grain.

X. Q. 46—When did he tell you about this second one, and how was it constructed?

A.—He told me that same harvest, toward the latter part of the harvest, I think, as much as I remember. It was a piece of sheet iron and screwed on the frame of the adjuster, as much as I remember. That is what he told me. I saw it myself some time after, and that

is the way I remember it.

X. Q. 47—Was that extension intended to remain straight while the lower end of the adjuster was moved, or not?

A.—I have not seen it on the machine.

X. Q. 48—What did you understand from seeing it, as mentioned in your answer to cross-question 46, and what did Heller tell you about it?

A.—Why, I have not seen it on the machine and Heller told me it was intended to keep the butts straight.

X. Q. 49—From your seeing it off the machine and from what Heller told you about it, did you understand that it was intended to operate in the same way as this exhibit here before you, particularly with reference to the extension part keeping straight while the lower end of the adjuster was being moved?

A.—No, sir. It could not work in the same way. The extension was screwed on the adjuster stiff and to move with it.

X. Q. 50—The purpose and object was the same, however, was it not?

A.—Yes, sir.

X. Q. 51—Do you know, or did Heller tell you how long he used that second form in the harvest of that year?

A.—I don't remember whether he told me, and I don't know whether he used it. I don't remember any more.

X. Q. 52—Will you be kind enough to describe exactly how the extension was kept straight or square with the butts in this adjuster and extension here before you?

A.—Well, I have seen this on the machine, and this iron or extension kept straight with the butts. I can't describe how it was fastened on any more.

X. Q. 53—And so you do not pretend to remember the details of its construction—how it was fastened on, or similar matters?

A.—Well, I have seen this on the machine and how it worked. I do not remember how it was fastened on or other details, except that it would bend there when the adjuster moved.

X. Q. 54—Have you ever seen this exhibit now before you since 1878, and before the beginning of the taking of testimony here yesterday?

A.—No, sir, I have not.

X. Q. 55—Then how do you know that this is the same adjuster and extension that you saw on Heller's machine in 1878?

A.—Well, I saw this or something like it on Heller's machine. This looks like it.

X. Q. 56—Then, as a matter of fact, you do not know whether you ever saw this particular exhibit before or not?

A.—As much as I remember, this is the same one, or it was just like it."

George Heller, son of Gottlieb Heller, testifies very fully concerning the extension to the butt-adjuster which was applied by his father in the harvest of 1878. (Transcript of Record, pp. 330–335.) He fully corroborates Gottlieb Heller as to the putting on by the latter of the rigid extension first, and using it a day or two and then substituting the automatic extension, which he believes to have been the identical device "Defendants' Exhibit Heller Butt-Adjuster with Adjustable Extension." (p. 331.) He also describes exactly how it operated and its purpose and effect, and corroborates Reinhard Rubin as to showing and explaining it to the latter in the harvest of 1878, (p. 333.)

Edwin D. Bishop (pp. 335–337) saw only the rigid extension, or at least that is his present belief, and he is probably correct, since this only would account for Heller's explanation to him in 1879 of an improvement

which he had made upon the extension which Bishop saw the year previous. (pp. 336–7.) Mr. Bishop did not see the improved device. Heller desired to show it to him, but he had not time to wait. The impression he has from what Heller told him on that day and the next, is that the extension was so arranged that when the adjuster was moved in any position the extension would stand perpendicular to the butts of the grain.

Rosina Heller, wife of Gottlieb Heller, on several occasions drove the machine in the field in the harvest of 1878, with the extension to the butt-board on it, and has a clear recollection of the device. Her testimony is to be found from p. 12 to p. 14 of the Additional Transcript of Record. She says, as to this device:

"Q. 1—State your name and residence?

A.—My name is Rosina Heller, and I reside near Dillon, Dickinson county, Kansas. I am the wife of Gottlieb Heller.

Q. 2—Do you remember the first grain-binder your husband owned, and if so, in what year did he buy it?

A.—Yes, I remember it; it was in 1878.

Q. 3—Did you ever operate that grain-binder, and if so, in what year?

A.—I did run it occasionally when my husband was called away in 1878. I run it in the field, but I do not remember whether it was cutting oats or wheat. I do not know whether I run it after 1878, but I may have done so after 1878, as my husband was sometimes called away.

Q. 4—Do you remember any attachments which your husband put upon that machine, and if so, what were they?

A.—He put a tin on the little elevator to keep the bundle straight on the bottom.

Q. 5—Was this tin on the little elevator or

butt-adjuster when you ran the machine in 1878?

A.—It was on the machine in 1878, when I run it.

Q. 6—Please examine defendants' exhibit, the Heller butt-adjuster with adjustable extension, and state whether you ever saw it before; if so, what is it?

A.—I saw this in 1878. It is the same thing that was on the machine in 1878, to keep the butts of the bundles straight.

Q. 7—Was it attached to the little elevator then in the same way that it now is?

A.—It was put on the same way as I see it here, with the exception that it had a rod running straight with the elevator attached to the machine with a screw, and the other end of the rod was attached to the end of the bent iron or bar that connects the upper side of the sheet-iron extension to the butt-adjuster. There was another rod attached to the little elevator on the top bar, through the hole near the lower end of the elevator. The rod run over the top of the machine to the iron with the notches to move it back and forth.

Q. 8—How would the sheet-iron part act when the elevator or butt-adjuster was moved forward and backward?

A.—It kept straight all the time with bottom of the bundle, and when the little elevator moved, it moved back and forth with the elevator. It holds itself straight in the same way with the elevator—straight with the bundle.

Q. 9—As I understand you, when the elevator was moved the sheet-iron also moved, but moved in such a way that the sheet-iron kept square with the butts of the bundle; is that correct?

A.—Yes, it held the bottom of the bundle straight.

*Cross-Examination by Mr. Banning.*

X. Q. 19—How was the bar of iron which was secured at its lower end to the bent portion of the iron or bar connecting the upper side of the sheet-iron extension of the butt-adjuster attached to the upper end of the frame of your husband's first machine?

A.—It was put on the machine with a screw into wood. The screw fastening it to a board at the top of the machine. It was screwed fast to the board. I never tried it to see if it was perfectly tight or could be moved a little.

X. Q. 20—But according to your best recollection, it could not slide up or down, could it?

A.—It was tight on the top.

X. Q. 21—In what direction did the bar extending up aside the butt-adjuster run—parallel with the upper board of the butt-adjuster or otherwise?

A.—It run straight, but I did not measure whether it was a little wider at one place than another, or not.

X. Q. 22—How was it when the butt-adjuster was worked?

A.—It was always straight, but the sheet-iron moved or swung.

X. Q. 23—You worked a good deal with these machines and understood the construction of the parts you have been speaking about pretty fully, did you not?

A.—I used them once in a while when my husband was away, and I understood about this, that the sheet-iron moved to keep the butts straight. I understood the parts I have been testifying about."

In view of this testimony, it seems absolutely impossible to doubt that in the year 1878 Heller devised and publicly and successfully used on his grain-binder an automatic

extension to the butt-adjuster which had all the properties of the corresponding device in the Steward patent. This fact was deemed by the court below to be fully and conclusively proved, and claims 20 and 21 were accordingly held to be void under the statute. The court says (Transcript of Record, p. 74):

> The two claims which it is insisted the Winona Company infringes are:
>
> "Twentieth. The combination, in a grain-binder, of moving butt-adjusting mechanism, and the board, $d^1$, substantially as described. Twenty-first. The combination of the swinging butt-adjuster, the arms, $d^2$, $d^3$, and $d^4$, and the board, $d^1$, pivoted to the swinging butt-adjuster, substantially as described."
>
> "The Winona Company undoubtedly use the mechanism, operating in the same manner, as described in the Steward specification and claims. The only difference between the butt-adjuster in the defendant McCormick machine and the Winona is the attachment $d^1$. The arms $d^2$, $d^3$, and $d^4$, with the frame, D, when operated, move like a parallel rule, and constitute a parallelogram; thus keeping the board attachment, $d^1$, parallel to the edge of the chute. Heller had put on a similar attachment, pivoted to the end of the butt-adjuster, in 1878; and, although the construction of the adjuster and attachment was crude, it operated successfully, and embodied, substantially, the alleged invention described by Steward. Although Heller may have been in error when in his deposition he stated that the "Exhibit Heller Butt-adjuster with Adjustable Extension," produced and put in evidence, was the identical device he put on his machine in 1878, the fact that he put on an extension to the butt-adjuster and used it, is fully proved. Schlesener, who contradicts Heller on the identity of the Exhibit

> "Heller Butt-adjuster," and says that he and Heller put it on his machine in 1880, corroborates him in regard to a butt-adjuster, with extension, being on Heller's machine in 1878. My conclusion is that there is no infringement by the Winona Company for these claims."

A vigorous attempt has been made to rebut the testimony as to the Heller public use. Mr. Steward himself attempts at great length to show that the Heller device, as he construes it, did not anticipate claims 20 and 21 of his patent. This is the testimony to which the attention of the Court was directed above, and it is to be found from p. 214 to p. 245 in the Transcript of Record. It is specious and strained from beginning to end. A considerable portion of it is based upon the hypothesis that the Heller device was badly constructed from a mechanical standpoint, whereas, as a matter of fact, there is no proof of this in the record. It may be and probably is true that a device made exactly after the rough sketch which Heller made on the witness stand would be out of proportion, but as has been before mentioned, no pretense was made that the sketch was drawn to scale. It seems needless to discuss the testimony of Mr. Steward in detail. If Heller did, in 1878 and 1879, what he and his corroborating witnesses swear he did, he fully anticipated Steward, and under the law no one subsequently contriving a similar device could obtain a valid patent for it.

In further rebuttal an effort is made to throw doubt on all the testimony going to show that Heller made and used any automatic extension to the butt-adjuster in the years 1878 and 1879; and to this end testimony is taken for the purpose of proving that the exhibit "Heller Butt-Adjuster with Adjustable Extension" was not made

for Heller's 1878 machine, but was made for Gottlieb Schlesener's machine in 1880. Schlesener first testified for the defendants (Adt'l Transcript of Record, pp. 3–6.) His principal testimony related to the wind-board which the McCormick Company and not the Winona Company was charged with infringing; but he was also asked concerning the extension to the butt-adjuster, and testified that Heller made an extension for his (Schlesener's) butt-adjuster in 1879. He also testified that the extension which he knew Heller to have on his machine was a board extension nailed on, and that this was in 1879 and 1880; and also that the extension which Heller put upon his (Schlesener's) machine was fastened rigidly to the lower end of the butt-adjuster.

Subsequently Schlesener was called in rebuttal of the Heller testimony, and changed the date of putting the extension to the butt-adjuster on his machine to 1880, saying that he was mistaken as to the date in his former testimony. He further testified that the sheet-iron extension constituting one of the parts of "Defendants' Exhibit Heller Butt-Adjuster with Adjustable Extension, Parts 1 and 2," is a piece that Heller with his assistance put on his (Schlesener's) binder in 1880. He also thinks he recognizes the other part of the exhibit from the fact that it has on it some rubber and cloth similar to that which he put on his own butt-adjuster. He says further that the device has been changed since it left his hands, the piece of hoop-iron at the top having been straight when the device was used on his machine. He claims to have used his binder with this rigid extension on it in the harvest of 1880 and 1881, and then, in the early part of the year 1882, to have sent it to the farm of one Messing, which was the last he saw of it. The only change that

he mentions as having been made in the extension while he had it was that he himself bent it back somewhat, as it came too close to the grain. The rebuttal testimony of Schlesener is to be found at p. 106 of the Transcript of Record. He is a neighbor of Heller's, knows him well and respects him. He believes that Heller is mistaken as to the identity of the exhibit above referred to, but he knows him too well to suppose that he would make an intentional misstatement of fact. The following occurs in his cross-examination (p. 113):

"X. Q. 109—You are well acquainted with Mr. Heller, are you not?

A.—Yes, sir.

X. Q. 110—Do you consider Mr. Heller an honest man?

A.—I think he is.

X. Q. 111—Mr. Heller is a religious and good man, is he not?

A.—Yes, I think he is.

X. Q. 112—If Mr. Heller testified to anything under oath, you would believe that he thought he was right, would you not?

A.—If he did not think he was right he would not do it."

It will be seen from this that Heller is in no way impeached by Schlesener's testimony, which at the most only goes to show that a certain exhibit which Heller believed to be the original of its kind was not in fact the original, but a reproduction. He also says in answer to X. Q. 117, that Mr. Heller "fixed round on machines a great deal, and could make them go when they were out of order."

Richard Messing, son of the man to whom Schlesener's binder was sent in the early part of 1882, is also called in rebuttal. He corroborates Schlesener to the extent

of saying that the binder which he received had on its butt-adjuster a rigid sheet-iron extension like that in the Heller exhibit, and also as to the piece of hoop-iron at the upper end of the extension, which he says was straight. He further testifies that in the spring of 1883 it was sent by Heller's direction to Weaver's farm, and here all trace of the machine was lost. Messing says he *thinks* it was removed from there that spring toward harvest, but this was only hearsay, (p. 117) and nothing is said as to where it went. Whitney, in the course of his argumentative deposition concerning this butt-adjuster extension, says (p. 297): "and it being further shown in evidence that this butt-extension exhibit was retained in the possession of Richard Messing, a witness who has testified in this case, until the season of 1883, *after which these parts, together with the harvester and binder, returned to the possession of Gottlieb Heller*," etc. Mr. Whitney allowed his zeal for his employer to act upon his imagination. *There is absolutely no such testimony in the record.* If any change was made in the extension to the butt adjuster, giving it the automatic properties that existed in Heller's 1878 device, there is no evidence as to when, where or by whom it was done. Weaver, whoever he may be, was not called as a witness, and there is not a word of testimony in the record to the effect that the Schlesener machine or any part of it ever went to Heller's farm. So far as the proof shows, it may be still on Weaver's farm. If the Heller exhibit is not the identical one that was on his machine in 1878 and 1879, but is the one that was on Schlesener's machine, with alterations, the only conclusion possible is that it is so like Heller's 1878 device that neither Heller, his wife, his son nor Reinhard Rubin could tell the difference.

X. Q. 113, in the deposition of Schlesener, is as follows:

> "X. Q. 113.—Now, Mr. Heller looked at that butt-adjuster and extension and swore that he believed it to be the same one that he made for his machine in 1878, and he said that he cut the sheet-iron piece from an old Kirby rake; now, you think, don't you, that Mr. Heller was mistaken?
>
> A.—Yes, I think he was mistaken in that."

The above question contains an error. Gottleib Heller did not say that the iron piece was cut from his Kirby rake, but this statement was made by George Heller, his son. Schlesener testified that this sheet-iron piece was cut from his Triumph rake, and the testimony of Kirby (Transcript of Record, p. 286) and of L. C. Bartley (Transcript of Record, p. 607) are in favor of the supposition that the piece came from a Triumph and not from a Kirby self rake. The Triumph and the Kirby self rake belong to the same class of machines; and whether Heller ever had a Triumph rake does not appear, except from the testimony of Whitney (page 290) and of Schlesener, who first says he did and afterward corrects his answer, saying that Mr. Heller had a Kirby reaper, but he thinks that he did not have a Triumph reaper. (See Transcript of Record, p. 114, X. Q. 118 to R. D. Q. 123.)

The fact is that the Kirby reaper and the Triumph reaper are machines of the same general class, of which the Kirby is the pioneer, and it is not surprising that Schlesener confused them until corrected by Mr. Whitney, (X. Q. 119), and it would not be surprising if George Heller used the term "Kirby rake" in the generic sense as indicative of the class and not the particular manufac-

ture. If Heller had a Triumph reaper, therefore, it is not improbable that George Heller might have referred to it as a Kirby; but however this may be, the question whether the particular exhibit "Heller Butt-adjuster with Adjustable Extension, Parts 1 and 2" is the identical one used on Heller's own machine in 1878 and 1879, or is the one used on Schlesener's machine in 1880 and 1881, is, and must remain, one of doubt. Schlesener appears to be an honest witness testifying to what he believes to be true; and there is no more reason to discredit his testimony than there is to discredit the testimony of Gottlieb Heller, his wife, his son and Rubin. All are absolutely disinterested, and if there are any mistakes in their testimony they are only such mistakes as honest people are liable to make. All have testified candidly and from full conviction. Gottlieb Heller, George Heller, Rosina Heller and Reinhard Rubin believed the Heller exhibit to be the original device that was used in 1878 and had good reason for this belief, since in construction and operation it is the same as that device; while Schlesener believed that it was not the Heller 1878 device, because it showed strong indications to him of being the one that was put upon his machine in 1880. Probability is given to the statements of Schlesener by the testimony of Kirby, who says that the sheet-iron extension was not taken from a Kirby reaper, of Bartley, who thinks it was cut from a piece that was attached to the outside divider of a Triumph reaper, and of Whitney, who corroborates Kirby and Bartley. If the testimony of Schlesener, Messing, Kirby, Bartley and Whitney is correct, it in no way impeaches the testimony relating to the Heller use in 1878 and 1879, but merely shows that the witnesses as to the Heller use were unable to distinguish between the

Heller device of 1878 and the one in evidence as an exhibit; so that if the exhibit embodies the subject-matter of claims 20 and 21 of the Steward patent, obviously the device used by Heller in the harvests of 1878 and 1879 must have fully anticipated that patent.

Realizing that the testimony of Schlesener, Messing, Kirby and Bartley in no way impeaches the credibility of Heller, his wife, his son and Rubin, but at most only shows a possible or probable mistake as to the identity of the exhibit, a special effort was made to discredit Heller personally by Whitney, who testifies in the dual capacity of detective and expert (Transcript of Record, pp. 288–305) and by Govenor Teats. Teats' deposition is to be found from pp. 118 and 125 of the Transcript of Record, and it is disgraceful to Teats and unworthy of the complainant. He undertakes to repeat a conversation that he had with Heller some months after Heller testified, and the conclusion he draws from a remark made to him by Mr. Heller is that Heller's testimony was "bought"—meaning of course that Heller, and with him all his corroborating witnesses, are perjurers, and that no such adjustable extension to the butt-adjuster as they describe was used in the harvests of 1878 and 1879. If this is not the impression that Teats sought to create, there could be no possible object in his testimony. An examination of the testimony will show that Mr. Heller's remark, even as quoted by Teats, does not justify Teats' interpretation of it, and if Heller's testimony had been "bought" it is not in the least degree probable that he would have gone about proclaiming the fact. After Heller gave his original testimony he was employed by the McCormick Company to look up witnesses relating to the prior use of the wind-board in which the McCormick

Company was interested, and he did diligent and effective work, for which he was fairly and perhaps liberally compensated, but there is nothing in the record to show that before he gave his original testimony he was promised or that he expected any compensation. Whitney was sent to Kansas by the complainant to work up rebuttal against the Heller testimony, and he also mentions conversations that he had with Heller (p. 289–91.) While evidently desirous of doing all he can for his employer by his testimony, he is too honest himself to impute dishonest intentions to another.

Teats is a small lawyer and notary in a small town, not above engaging in detective work if it promises to be profitable. Before being employed by the complainant, he acted as special examiner in taking testimony for the defendants. Like many detectives he seems to have done his best to entrap the man upon whose track he had been set. The only surprising feature of his testimony is, that while he was about it he did not contrive in some way to make out a stronger case against Heller. As before intimated, the sum and substance of his testimony is that he puts the very worst construction that he can upon a remark which he claims Heller made to him in a casual conversation.

R. X. Q. 73 and the answer thereto which close his deposition (p. 125) are as follows:

"R. X. Q. 78—Suppose you were to say to somebody that you had been paid the equivalent of fifty dollars for your testimony here in Chicago, which would be true, and that if you had been sharper you could have got more, would it be fair for anybody to suppose from that that you had testified falsely?

A.—I have not so construed it; I have not

> put a construction upon his language, I am only taking it for what it is worth; if I should tell a man that I got fifty dollars or one hundred and fifty dollars for my testimony in a certain case without further explanation, I would naturally suppose the party to construe the meaning of what I said, that my testimony was bought. Of course a witness in all cases receives his expenses and just compensation for his time, or should at least, which that fact alone does not indicate that his testimony is purchased."

Perhaps the less likely a man is to give testimony that is "bought" the less cautious he is liable to be in the matter of making casual remarks concerning it which may be taken up by amateur sleuths and construed to his disadvantage.

As bearing upon the Heller use and the sufficiency of the proof regarding it, the attention of the Court is called to the following cases:

*Brush* v. *Condit*, 132 U. S. 39.
*Egbert* v. *Lippmann*, 104 U. S. 333.
*Miller* v. *Foree*, 116 U. S. 22.
*Coffin* v. *Ogden*, 18 Wall. 120.

For the reasons above presented it is respectfully urged that the decision of the court below should be affirmed. Recapitulated, the grounds on which such a decision by the Court is asked are, as to the Olin patent:

1. That the Olin patented device proved on trial to be inherently worthless, and hence was never adopted, even by the complainant himself, who owned the patent and built the experimental machine;

2. That the claims, even under the most literal construction, are of doubtful validity in view of the prior art;

3. That the device employed by the defendants is a different invention, patented under another patent to other inventors, has gone into general use, and is used by the complainant himself;

4. That no claim of infringement was set up by the complainant until after the different and successful device had been in general use on all Appleby machines for years, without protest or warning from him; and

5. That the defendants have never infringed.

As to the Steward patent the grounds are:

1. That claim 20, if the board $d'$ is pivoted, is for an incomplete and inoperative combination, and if completed by reference to the specification the defendants do not nifringe it;

2. That claim 21 is for a combination of parts not found in the defendants' machine, and that hence the defendants do not infringe it; and

3. That both claims are anticipated by the Heller butt-adjuster with adjustable extension of 1878 and 1879, and claim 20 by the rigid Heller extension used in the same years and subsequently.

Respectfully submitted,

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*for Appellees.*